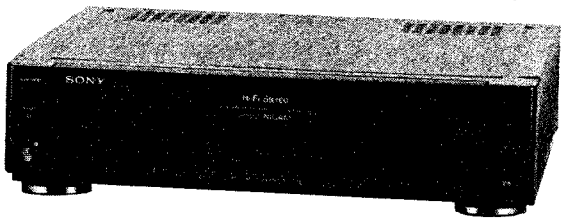
SLV-E90AP/IT/NC/NP/UX/VC
RMT-V141/V142/V146C

SERVICE MANUAL

V11801



AEP Model
SLV-E90AP
Italian Model
SLV-E90IT
North European Model
SLV-E90NC
Spanish Model
SLV-E90NP
UK Model
SLV-E90UX
Germany Model
SLV-E90VC

VHS Hi-Fi

- **Refer to the SERVICE MANUAL of VHS MECHANICAL ADJUSTMENT II for MECHANICAL ADJUSTMENT. (9-972-816-11)**

SPECIFICATIONS

System

Channel coverage

EXCEPT UX :
PAL :

VHF	E2-E-12
CATV	S01-S03, S1-S20
HYPER	S21-S41
UHF	E21-E69

UX:

UHF	B21-B69

RF output signal
UHF channels 30 – 39

Aerial out
75-ohm asymmetrical aerial socket

Inputs and outputs

EURO-AV (LINE 1)
CANAL+ (NP, VC)
21-pin
Video input: pin 20
Audio input: pins 2 and 6
Video output: pin 19
Audio output: pins 1 and 3

LINE IN 2 (UX)
LINE IN 3 (EXCEPT UX)
VIDEO IN, Phono jack (1)
Input signal: 1 Vp-p, 75 ohms, unbalanced, sync negative
AUDIO IN, Phono jack (1)
Input level: –7.5 dBs (0 dBs = 0.775 Vrms)
Input impedance: more than 47 kilohms

EURO-AV (LINE IN 3) (UX)
21-pin
Video input: pin 20
Audio input: pins 2 and 6

LINE OUT 2
VIDEO OUT, Phono jack (1)
Output signal: 1 Vp-p, 75 ohms, unbalanced, sync negative
AUDIO OUT, Phono jack (1)
Output level: –7.5 dBs (0 dBs=0.775 Vrms)
Load impedance: more than 47 kilohms
Output impedance: less than 10 kilohms

General

Power requirements
220 – 240 V AC, 50 Hz

Power consumption
30 W

Operating temperature
5°C to 40°C

Storage temperature
–20°C to 60°C

Dimensions
Approx. 430 × 110 × 372 mm (w/h/d)
including projecting parts and controls

Weight
Approx. 5.9 kg

– Continued on next page –

MICROFILM

VIDEO CASSETTE RECORDER

SONY®

Supplied accessories

Remote commander (1)
  RMT-V141 (SLV-E90UX)
  RMT-V142 (SLV-E90NP)
  RMT-V146C (SLV-E90AP/IT/NC/VC)
R6 (size AA) batteries (2)
Aerial cable (1)
Audio/video cable (1)
Mains lead (1)
RF screwdriver (1)

Design and specifications are subject to change without notice.

SAFETY CHECK-OUT

After correcting the original service problem, perform the following safety checks before releasing the set to the customer:

1. Check the area of your repair for unsoldered or poorly-soldered connections. Check the entire board surface for solder splashes and bridges.
2. Check the interboard wiring to ensure that no wires are "pinched" or contact high-wattage resistors.
3. Look for unauthorized replacement parts, particularly transistors, that were installed during a previous repair. Point them out to the customer and recommend their replacement.
4. Look for parts which, though functioning, show obvious signs of deterioration. Point them out to the customer and recommend their replacement.
5. Check the B+ voltage to see it is at the values specified.

SAFETY-RELATED COMPONENT WARNING!!

COMPONENTS IDENTIFIED BY MARK ⚠ OR DOTTED LINE WITH MARK ⚠ ON THE SCHEMATIC DIAGRAMS AND IN THE PARTS LIST ARE CRITICAL TO SAFE OPERATION. REPLACE THESE COMPONENTS WITH SONY PARTS WHOSE PART NUMBERS APPEAR AS SHOWN IN THIS MANUAL OR IN SUPPLEMENTS PUBLISHED BY SONY.

TABLE OF CONTENTS

SERVICE NOTE

1. RETURNING PINCH ROLLER, GUIDE ROLLER AND ELEVATOR CAM TO STOP CONDITION

1) Remove the bottom panel.
2) Turn the worm gear Ⓐ of the cam motor, located at lower of the MD, to the arrow direction Ⓑ by finger.

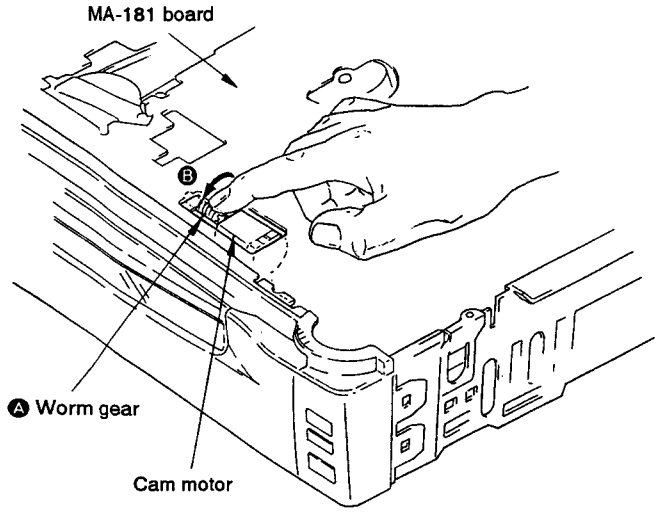


Fig. 1.

2. WINDING TAPE TO CASSETTE HALF

Turn the flywheel Ⓐ of the capstan motor to the arrow direction Ⓑ by finger, then the cassette tape will be wound to the cassette half.

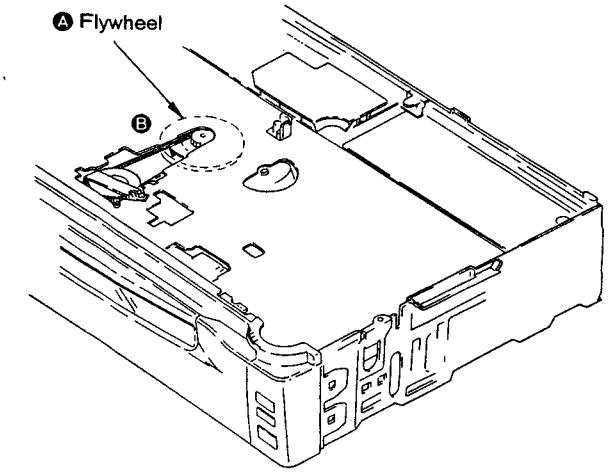


Fig. 2.

3. TAKING OUT CASSETTE WHEN UNIT IS DEFECTIVE WITH CASSETTE IN

1) Remove the upper case.
2) Turn the worm gear Ⓐ of the FL cassette compartment motor to the arrow direction Ⓑ by finger.

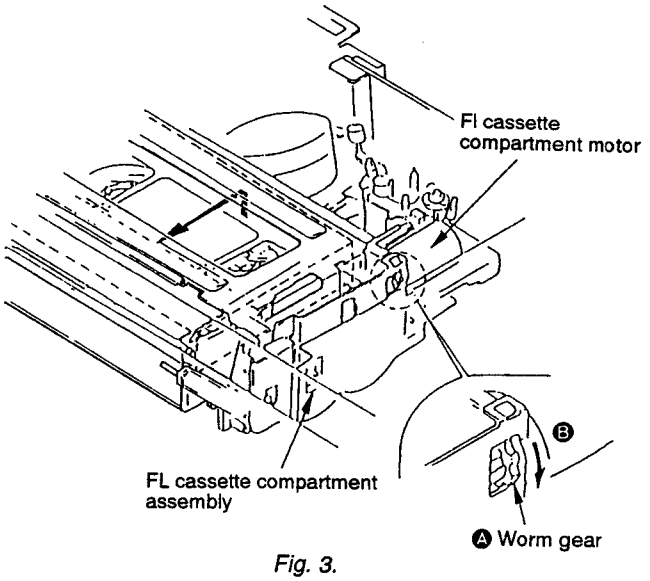


Fig. 3.

Note: When performing 1. to 3., be careful not to clog and damage the cassette tape.

4. UPPER DRUM REPLACEMENT

4-1. Removal of Upper Drum

1) Remove the screw ❶ (+P3 × 6) and take out the grounding shaft ❷. (See Fig. 4.)
2) Completely remove the rotary upper drum board and desolder the soldering indicated by the arrows.
3) Remove two screw ❸ (PSW3 × 8) and take out the rotary upper drum in the arrow direction Ⓐ. (See Fig. 5.)
   If it difficult, remove by shaking the rotary upper drum gradually.

Note: If the drum can not be removed, check wheater the solders have been removed or not again.

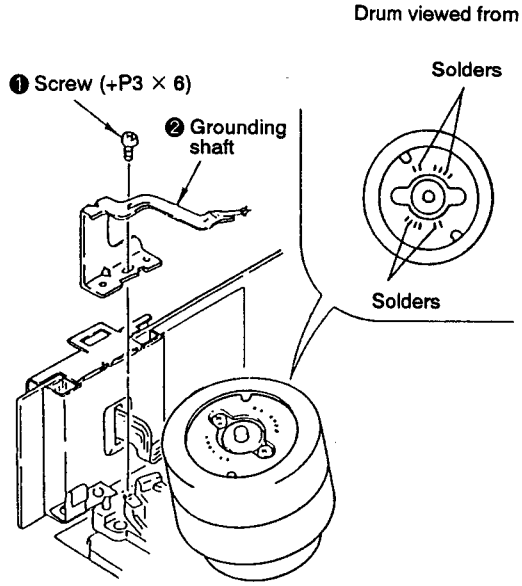


Fig. 4.

4-2. Mounting Upper Drum

1) When inserting the rotary drum into the lower drum, be careful not to blur the contacting surface with fingerprint or the like.
2) Mount the rotaly upper drum board by aligning marked ➡ with marked ⇌ of rotary transformer board (lower drum) so that the screw holes of both upper and lower drums match. (See Fig. 5.)
3) If it is difficult, mount the upper drum by shaking it gradually.
   Note: Be careful not to damage the head. Make sure that the upper drum is tightly inserted.
4) Tighten two screws ❸ (PSW3 × 8). (See Fig. 5.)
   Note: Temporary tighten two screws. After making sure that upper drum is tightly inserted, tighten the screws.
5) Solder points on the board of the rotary upper drum.
6) Fix the grounding shaft ❷ using the screw ❶ (+P3 × 6) so that the protrusin of grounding shaft end contacts the center of the drum shaft.
   Note: When attaching the grounding shaft ❷, be careful not to apply force to the spring section of it.

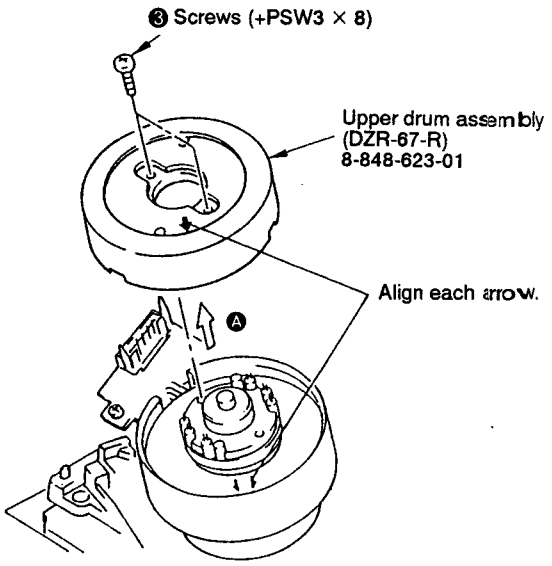
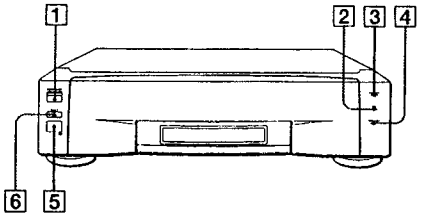


Fig. 5.

Index to parts and controls

Refer to the pages indicated in ( ) for details.

Front panel, with cover closed



1 ON/STANDBY switch/indicator

2 REC (recording indicator)

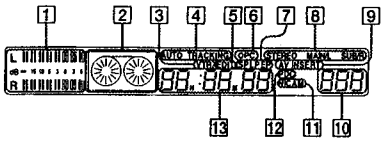
3 SYNCHRO EDIT indicator (40)

4 TIMER REC (recording) indicator (20)

5 Remote sensor (6)

6 ⏏ EJECT button (17)

Display window



1 Peak level meter

2 Tape/playback mode indicator

3 VTR indicator (8)

4 AUTO TRACKING indicator (32)

5 EDIT indicator

6 OPC indicator (32)

7 Tape speed indicators (19)

8 Sound indicators (22)

9 AV INSERT indicator (37)

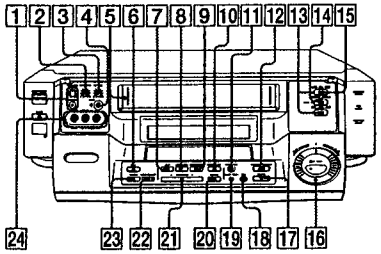
10 Line/Programme position indicator

11 NICAM indicator (21)

12 PDC indicator (25)

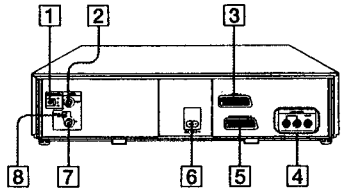
13 Timer/time counter/Clock

Front panel, with cover opened



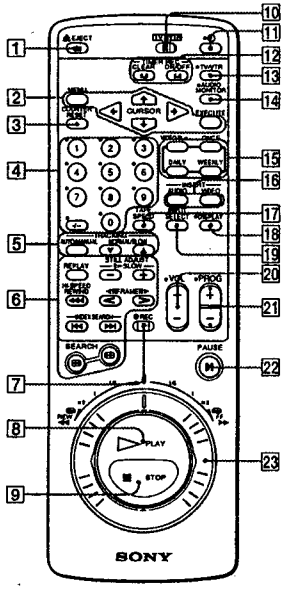
1 Headphone jack and volume control
2 REC BALANCE control (19)
3 REC LEVEL control (19)
4 LANC jack (39)
5 Tape compartment
6 OPC button (32)
7 EDIT button (36)
8 AUDIO INSERT button (37)
9 VIDEO INSERT button (37)
10 SYNCHRO EDIT button (40)
11 TIMER REC ON/OFF button (20)
12 ◀◀◀ HI-SPEED REWIND button (17)
13 BACKLIGHT switch (15)
14 NTSC PB switch (16)
15 COLOR SYSTEM switch (16)
16 DUAL MODE SHUTTLE ring (17)
17 ❚❚ PAUSE button (17)
18 ● REC button (19)
19 QUICK TIMER button (20)
20 PDC button (25)
21 PROGRAM buttons (8)
22 INPUT SELECT button (8)
23 TV/VTR button (8)
24 LINE IN 2 jacks (35)

Rear panel



1 RF CHANNEL screw (8)
2 AERIAL OUT connector (7)
3 EURO-AV (LINE IN 3) connector (14)
4 LINE OUT 2 jacks (7)
5 EURO-AV (LINE 1) connector (7)
6 AC IN connector (7)
7 AERIAL IN connector (7)
8 LOCAL/DX switch (15)

Remote commander



1 ⏏ EJECT button (17)

2 Menu operation buttons (7)
MENU button
CURSOR ↑/↓/←/→ buttons
EXECUTE button

3 COUNTER RESET button (18)

4 Programme number buttons and -/-- button (10)

5 TRACKING buttons (32)
▼/▲ NORMAL/SLOW
STILL ADJUST buttons
AUTO/MANUAL button

6 Tape transport buttons
▮► SLOW buttons (30)
REPLAY button (31)
◄▮/▮► FRAME buttons (30)
◄◄◄ HI-SPEED REWIND button (17)
⏮/⏭ INDEX SEARCH buttons (33)
⏪/⏩ SEARCH buttons (17)

7 ● REC (recording) button (19)

8 ▷ PLAY button (17)

9 ■ STOP button (17)

10 TV/VTR remote control switch (6)

11 ⏻ (on/standby) button (8)

12 TIMER REC buttons
CLEAR button (28)
ON/OFF button (20)

13 TV/VTR button (8)

14 AUDIO MONITOR button (18)

15 VIDEO Plus+ buttons (26)
VIDEO Plus+ button
ONCE button
DAILY button
WEEKLY button

16 INSERT buttons (37)
AUDIO button
VIDEO button

17 TAPE SPEED button (19)

18 DISPLAY button (18)

19 INPUT SELECT button (8)

20 VOL (volume) button

21 PROG (programme) button (8)

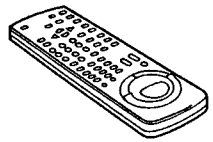
22 ▮▮ PAUSE button (17)

23 DUAL MODE SHUTTLE ring (17)

Step 1 Unpacking

Check that you have the following items:

- **Remote commander**

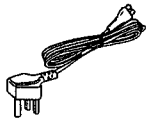


- **R6 (size AA) batteries**

- **Aerial cable**

- **Audio/video cable**

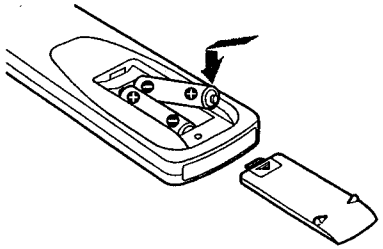
- **Mains lead**



- **RF screwdriver**

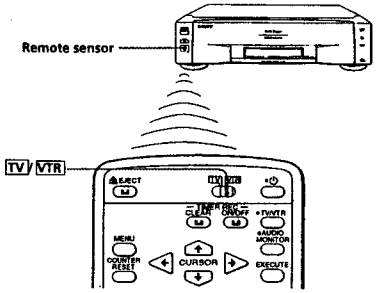
Step 2 Setting up the remote commander

Insert two R6 (size AA) batteries by matching the + and – on the batteries to the diagram inside the battery compartment.



Using the remote commander

You can use this remote commander to operate this VCR and a Sony TV. Buttons on the remote commander marked with a dot (•) can be used to operate your TV.

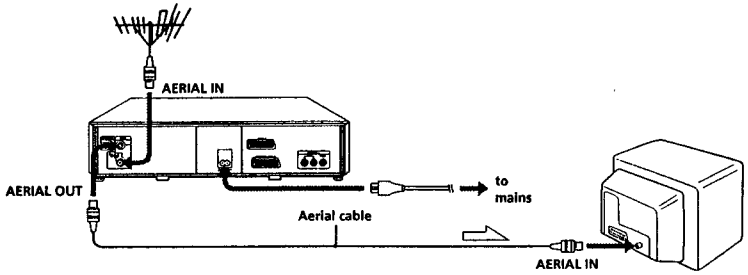


To operate	Set TV/VTR to
the VCR	VTR and point at the remote sensor on the VCR
a Sony TV	TV and point at the remote sensor on the TV

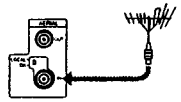
Notes

- With normal use, the batteries should last for approximately three to six months.
- If you do not use the remote commander for an extended period of time, remove the batteries to avoid possible damage from battery leakage.
- Do not use a new battery with an old one.
- Do not use different types of batteries.

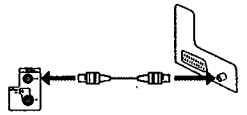
Step 3 Connecting the VCR



1 **Disconnect the aerial input cable from your TV and connect it to AERIAL IN of the VCR.**

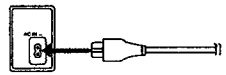


2 **Connect AERIAL OUT of the VCR and the aerial input of your TV using the supplied aerial cable.**



3 **Connect AC IN of the VCR and the mains supply using the mains lead.**

You've completed the basic hookup to watch and record TV programmes.

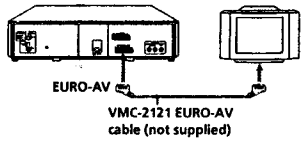


Additional connections

To a TV that has a EURO-AV (Scart) connector

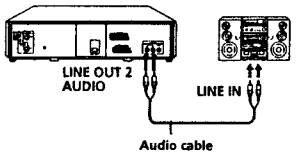
This additional connection can improve picture and sound quality.

1 Connect to the TV as shown on the right.
2 Set RF MODULATOR to OFF.
  1) Press MENU.
  2) Press CURSOR ↑/↓ to select SET UP MENU, then press EXECUTE.
  3) Press CURSOR ↑/↓/←/→ to select RF MODULATOR and set to OFF. (See page **34**.)



To a stereo system

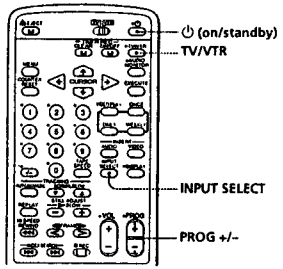
You can improve sound quality by connecting to a stereo system as shown on the right.



1-3

Step 4 Tuning the TV to your VCR

If you have connected the VCR to your TV using the EURO-AV cable, skip this step.

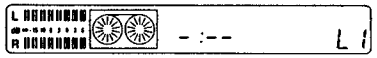


1 ⏻

Press ⏻ (on/standby) to turn on the VCR.

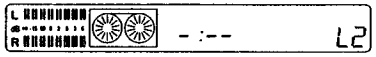
2 •TV/VTR

Press TV/VTR to light "VTR" in the display window.



3 INPUT SELECT

Press INPUT SELECT until "L2" appears in the display window.



4

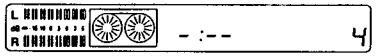
Turn on your TV and select a programme position for video playback.

5

Tune the TV between UHF channels 30 and 39 so that a grey screen appears on the TV screen.
Refer to your TV manual for tuning instructions.

6 INPUT SELECT

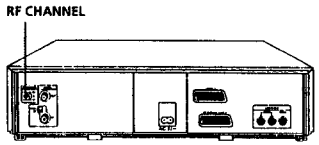
Press INPUT SELECT until "L2" disappears and a programme number appears instead.



7 •PROG + –

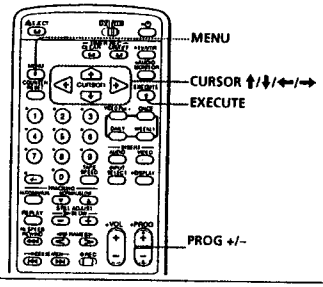
Press PROG +/– to check to see if the TV screen changes to a different programme.
You have now tuned your TV to the VCR. Whenever you play a tape, set the TV to the programme position selected in step **4** above.

To obtain a clear grey screen
The grey screen may not appear clearly in step **5** above. In this case, turn the RF CHANNEL screw at the rear of the VCR with the supplied RF screwdriver, to a position where the TV clearly displays a grey screen.



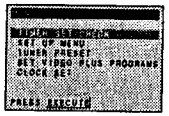
Step 5 Tuning the VCR to TV channels

Now you can set your VCR to receive broadcast channels using the on-screen display.



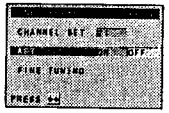
1 MENU

Press MENU.
The following menu appears on the TV screen.



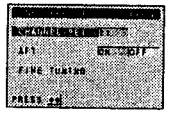
2 CURSOR, EXECUTE

Press CURSOR ↑/↓ to move the cursor (▮) to TUNER PRESET, then press EXECUTE.



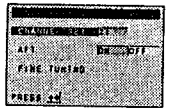
3 CURSOR

Press CURSOR ↑/↓ to move the cursor (▮) to CHANNEL SET.



4 •PROG + –

Press PROG +/– to select the programme position.



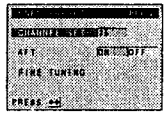
(continued)

Step 5 Tuning the VCR to TV channels (continued)

5 CURSOR

Press CURSOR ➡ to start tuning.
The VCR starts searching for a channel and displays the first one it finds on the TV screen. Press CURSOR ⬅/➡ repeatedly until the channel you want is displayed.

If you know the number of the channel you want, press the number buttons. For example, for channel 43, first press "4" and then press "3."



6

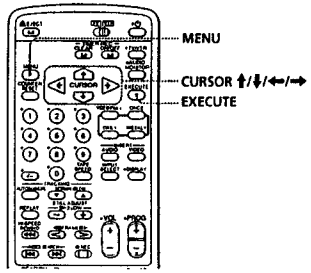
To allocate another channel to another programme position, repeat steps 4 and 5.

7 EXECUTE

Press EXECUTE to store all the allocated channels.

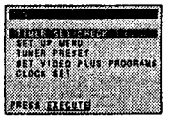
Step 6 Setting the clock

You must set the time and date on the remote commander to be able to use the timer recording features properly.



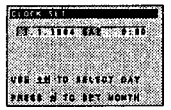
1 MENU

Press MENU.
The main MENU appears on the TV screen.



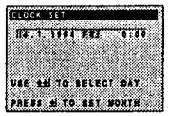
2 CURSOR, EXECUTE

Press CURSOR ↑/↓ to move the cursor (▮) to CLOCK SET, then press EXECUTE.
The CLOCK SET menu appears on the TV screen and the day is highlighted.



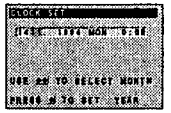
3 CURSOR

Set the day using CURSOR ↑/↓.
The day of the week is set automatically.



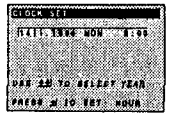
4 CURSOR

Press CURSOR ➡ to highlight the month.
Set the month using CURSOR ↑/↓.



5 CURSOR

Press CURSOR ➡ to highlight the year.
Set the year using CURSOR ↑/↓.

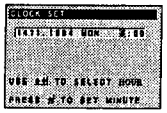


(continued)

Step 6 Setting the clock (continued)

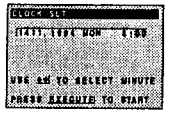
6 CURSOR

Press CURSOR ➡ to highlight the hour.
Set the hour using CURSOR ↑/↓.



7 CURSOR

Press CURSOR ➡ to highlight the minutes.
Set the minutes using CURSOR ↑/↓.



8 EXECUTE

Press EXECUTE to start the clock.

Note

- The menu disappears automatically if you don't proceed for more than one minute.

Step 7 Setting up VIDEO Plus+

VIDEO Plus+ is a feature in Sony VCRs that simplifies the task of programming the VCR to make timer recordings.

How VIDEO Plus+ works

Whenever you want to record a TV programme, all you need to do is look up the programme's "PlusCode," a number assigned to each programme that's published in TV guide magazines. Then, just enter the PlusCode of the programme you want and the VCR is automatically programmed to record that show. It's that simple. With VIDEO Plus+, you no longer have to go through a lengthy and often repetitive procedure when you set start and stop times, channel numbers, and dates. All this information is automatically sent to your VCR when you enter the programme's PlusCode.

How to set up your VCR

Before using VIDEO Plus+ to make timer recordings, check whether the programme position number assigned to each TV channel matches those you have preset on the VCR.

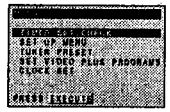
The initial assignment is:

TV channel	BBC 1	BBC 2	ITV	CH 4	CH 5
Programme position	1	2	3	4	5

For example, if ITV is preset to programme position 7 on your VCR, you must change the initial assignment using the following procedure. For programme positions whose numbers are the same, you can skip this procedure.

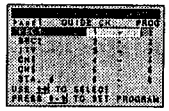
1 MENU

Press MENU.
The main MENU appears on the TV screen.



2 CURSOR, EXECUTE

Press CURSOR ↑/↓ to move the cursor (▮) to SET VIDEO PLUS PROGRAMS, then press EXECUTE.
The SET VIDEO PLUS PROGRAMS menu appears.

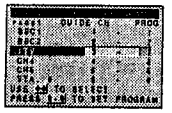


3 CURSOR

Press CURSOR ↑/↓ to move the cursor (▮) to the TV channel whose programme position number you want to change.
The programme position is highlighted.

4 1 2 3 4 5 6 7 8 9 0

Enter the programme position number that you have preset on your VCR.
To change other initial settings, repeat steps **3** and **4**.



5 EXECUTE

When you've finished, press EXECUTE to exit.

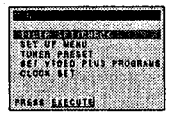
Step 7 Setting up VIDEO Plus+ (continued)

How to preset satellite channels

If you connect the VCR to a satellite tuner, you must preset the satellite channels to make timer settings for satellite programmes using VIDEO Plus+. Once you have made the settings, you don't need to modify them unless you change the VCR-satellite tuner connection. However, if you have connected more than one satellite tuner to the VCR via the AERIAL IN connector, the EURO-AV (Scart) connector (Line 1 and Line 3) and the LINE 2 VIDEO/AUDIO jacks (Line 2), you must change the settings each time you change the tuner on which you want to receive a satellite programme.

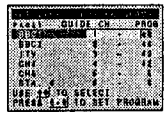
1 MENU

Press MENU.
The main MENU appears on the TV screen.



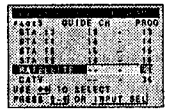
2 CURSOR, EXECUTE

Press CURSOR ↑/↓ to move the cursor (▮) to SET VIDEO PLUS PROGRAMS, then press EXECUTE.
The SET VIDEO PLUS PROGRAMS menu appears.



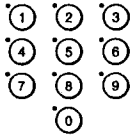
3 CURSOR

Press CURSOR ↑/↓ to move the cursor (▮) to SATELLITE.
The SET VIDEO PLUS PROGRAMS menu consists of three on-screen pages. Press and hold CURSOR ↓ to move the cursor (▮) to the third page, and select SATELLITE.



4

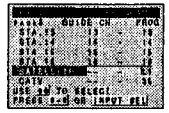
Enter the programme position number for satellite broadcasts:



- **If you have connected the satellite tuner via the AERIAL IN jack, enter the programme position number.**
  Use the number that is used for viewing satellite programmes on the VCR. (If you use programme position 50 to view satellite programmes on the VCR, enter "5" and then "0.")

INPUT SELECT

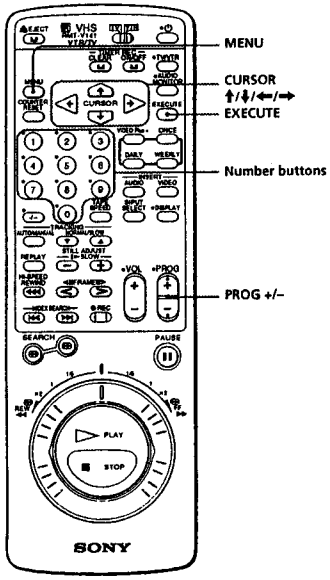
- **If you have connected the satellite tuner via the EURO-AV (Scart) LINE 1/LINE IN 3 connector or the LINE 2 VIDEO/AUDIO jacks, press INPUT SELECT.**
  If you have connected the satellite tuner via the EURO-AV (Scart) connector, select L1 or L3; if you are using the LINE 2 VIDEO/AUDIO jacks, select L2.

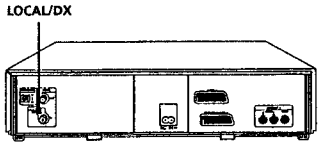


5 EXECUTE

When you've finished, press EXECUTE to exit.

Additional tuning instructions

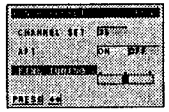




If the picture is not clear

Normally, the Auto Fine Tuning (AFT) function automatically tunes in channels clearly. If, however, the picture is not clear, you may also use the manual tuning function.

1 Press PROG +/– to select the programme number for which you cannot obtain a clear picture.
2 Press MENU, then select TUNER PRESET and press EXECUTE.
3 Select FINE TUNING. The fine tuning meter appears.



4 Press CURSOR ←/→ to get a clearer picture, then press EXECUTE. Note that the AFT (Auto Fine Tuning) setting switches to OFF.

If the TV signal is too strong

Set the LOCAL/DX switch on the rear of the VCR to LOCAL.

Disabling unwanted programme positions

After tuning the TV channels, you can disable unused programme positions. Positions that are disabled will be skipped later when you press the PROG +/– buttons.

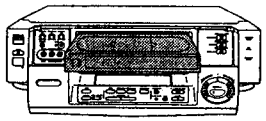
1 Press MENU, then select TUNER PRESET and press EXECUTE.
2 Press PROG +/– until the programme position you want to disable appears beside "PROG" on the TV screen.
3 Press number button "0" twice to display the number "0" beside CHANNEL SET.
4 Repeat steps **2** and **3** for other positions you want to disable.
5 Press EXECUTE.

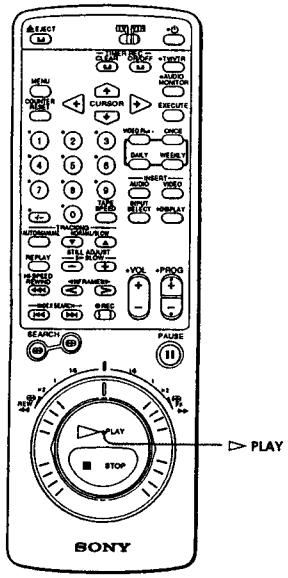
Adjusting the display window backlight

To	Set the BACKLIGHT switch to
Turn on the backlight	BRT
Dim the backlight	DIM
Turn off the backlight	OFF

1-7

Playing a tape





This section shows you how to play back a video tape.

1 **Turn on your TV and tune in to the VCR:**

- If the TV is connected to the VCR using the EURO-AV cable, set the TV to video input.
- If the TV is connected to the VCR using only the aerial cable, set the TV to the programme position for the VCR.

2 **Open the drop down panel and insert a tape.**

The VCR turns on automatically. The tape starts playing automatically if its safety tab has been removed. (See page **22**.)

3 **Set the COLOR SYSTEM switch on the VCR to match the colour system of the tape to be played back.**

Normally this switch should be set to AUTO. If streaks appear when playing back a video tape, select the colour system format that matches the format the video tape was recorded with to obtain a better picture. After you are finished, return the COLOR SYSTEM switch to the AUTO position.

Colour system	Switch position
PAL	PAL
NTSC	NTSC

4 **When playing back NTSC-recorded tapes, set the NTSC PB switch on the VCR to match the TV system you are using.**

Your TV/monitor	Switch position
PAL	ON PAL TV
NTSC	NTSC 4.43

5 **Press ▷ PLAY to start playing.**

When the tape reaches the end, the VCR automatically rewinds it to the beginning. (The power remains on.)

Note

- Tapes recorded in EP mode (with the NTSC system) do not reproduce hi-fi sound when played back.

Tip

- For further information on searching and playback functions, see "Playing/ searching at various speeds" on page **30**.

When you play back NTSC-recorded tapes

- The display will not appear even if you press DISPLAY.
- Depending on the TV you are using, any of the following may occur:
  - the picture becomes black and white
  - the picture shakes
  - no picture appears on the screen
  - black streaks appear horizontally on the screen
  - the colour density increases or decreases
  - the audio becomes normal audio and noise appears in EP mode.
- If a tape has portions recorded in both the PAL and NTSC video systems, the tape counter reading will not be correct. This discrepancy is due to the difference between the counting cycles of the two video systems.

Additional tasks

To	Press
Stop play	■ STOP
Pause play	❚❚ PAUSE
Resume play after pause	❚❚ PAUSE or ▷ PLAY
Search forward	Turn the DUAL MODE SHUTTLE (DMS) ring to ⊜ during playback
Search backward	Turn the DMS ring to ⊜ during playback
Fast-forward the tape	Turn the DMS ring to ▶▶ FF during stop
Rewind the tape	Turn the DMS ring to ◀◀ REW during stop
Rewind the tape at high speed	◀◀◀ HI-SPEED REWIND
Eject the tape	⏏ EJECT

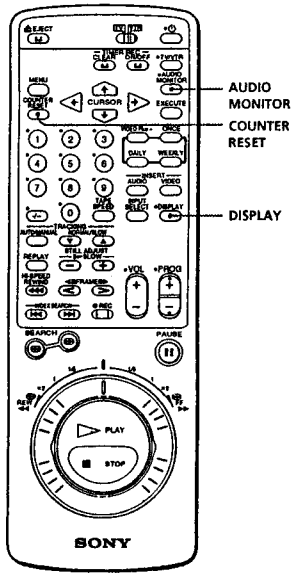
Playing a tape (continued)

Notes

- When a tape is reinserted, the counter returns to "0H00M00S."
- The counter will not work on tape portions with no recording.

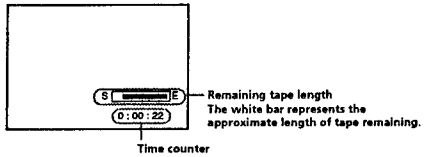
Notes

- When you play a tape recorded in monaural, the sound is heard in monaural regardless of the AUDIO MONITOR setting.
- To play a tape in stereo, you must use the EURO-AV connection or a LINE or AUDIO OUT connection.
- If AUDIO MIX in the SET UP MENU is set to ON, the AUDIO MONITOR button doesn't work.



Displaying the remaining tape length and time counter

Press DISPLAY to turn the display on or off.



Using the time counter

At the point on a tape that you want to find later, press COUNTER RESET to reset the counter to"0H00M00S." When you rewind or advance the tape to this point, refer to the counter.

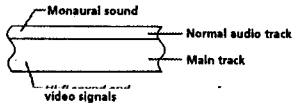
Playing stereo and bilingual programmes

Press AUDIO MONITOR to select the desired sound. Each press of the button changes the display on the VCR and TV screen.

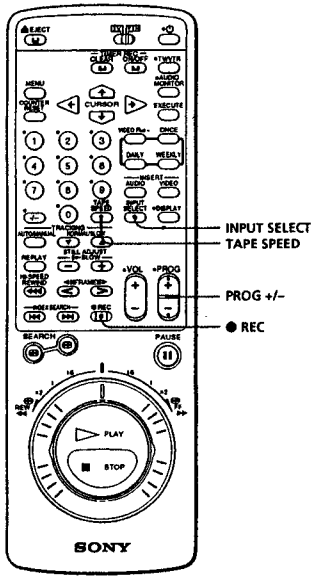
To listen to a		Press AUDIO MONITOR until	
Stereo tape	Bilingual tape	The TV screen shows	The display window indicator shows
Stereo	Main and sub sounds	"STEREO"	"STEREO"
Left channel	Main sound	"LCH"	"MAIN/L"
Right channel	Sub sound	"RCH"	"SUB/R"
Sound on normal audio track (monaural)	Sound on normal audio track	No indication	No indication

How sound is recorded on a video tape

This VCR records sound onto two different tracks. High-fidelity sound (usually stereo) is recorded onto the main track along with the picture. Monaural sound is recorded onto the normal audio track along the edge of the tape.



Recording TV programmes



Note

- If you insert a cassette with its safety tab removed, the VCR starts playing. To record on this tape, cover the tab hole on the cassette, or the VCR will eject it when your press ● REC.

Tip

- To select programme positions, you can also use the number buttons on the remote commander. For two-digit numbers, press the -/-- (ten's digit) button followed by the number buttons.

This section shows you how to record TV programmes in the most basic way: manual recording. With manual recording, you start the VCR recording when the programme begins, then stop it when the programme ends. The VCR also provides the following ways of recording:

- Manually start recording, then stop it automatically—"Recording using the quick timer" (page 20)
- Automatically start and stop recording—"Recording TV programmes using the timer" (page 23)
- Automatically start and stop recording by simply entering the "PlusCode" number—"Recording TV programmes using VIDEO Plus+" (page 26)

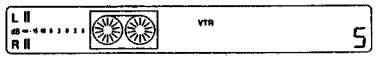
1 **Turn on your TV and tune in to the VCR:**

- If the TV is connected to the VCR using the EURO-AV cable, set the TV to video input.
- If the TV is connected to the VCR using only the aerial cable, set the TV to the programme position for the VCR.

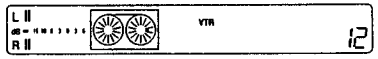
2 **On the VCR, set the REC LEVEL control to "5" and the REC BALANCE control to the centre.**

3 **Open the drop down panel and insert a tape with its safety tab in place.**

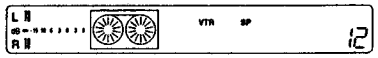
4 **Press INPUT SELECT until a programme position appears in the VCR's display window.**



5 **Select the desired programme position by pressing PROG +/–.**



6 **Select the tape speed, SP (standard play) or LP (long play), by pressing TAPE SPEED.**
See "To select tape speeds" on the next page.

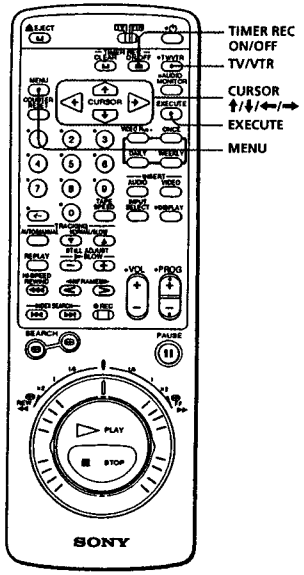


7 **Start recording by pressing ● REC.**
When the tape reaches the end, the VCR automatically rewinds it to the beginning.

Recording TV programmes (continued)

Tips

- To cut out an unwanted scene while recording, press ❚❚ PAUSE, turn the DUAL MODE SHUTTLE ring on the VCR to rewind the tape to the beginning of the unwanted scene, then press ❚❚ PAUSE to resume recording.
- The display appears on the TV screen indicating information about the tape, but the information will not be recorded on the tape.
- If you don't want to watch TV while recording, you can turn off the TV. When using a decoder, make sure to leave it on.



To stop recording

Press ■ STOP.

To select tape speeds

When recording, select either SP or LP. LP provides recording time twice as long as SP. However, SP provides better picture quality. You can mix SP and LP on the same tape. When playing back, the VCR automatically detects the tape speed. See the table below for the maximum recording/playback time in each speed.

Tape type	Maximum recording/playback time	
	SP	LP
E-240	4 hrs.	8 hrs.
E-180	3 hrs.	6 hrs.
E-120	2 hrs.	4 hrs.
E-60	1 hr.	2 hrs.

Recording using the quick timer

The quick timer enables you to record for a specified period of time in intervals of 30 minutes. Once you specify the recording time, the VCR automatically stops recording. Before you begin, check that the clock is set correctly.

After you start recording, press QUICK TIMER until the desired duration appears in the display window. The TIMER REC indicator on the VCR lights up. Each press increases the recording duration in increments of 30 minutes as shown below.

0:00 → 0:30 → 1:00 ----- 8:30 → 9:00 →

The recording duration decreases minute by minute to 0:00, then the VCR turns off automatically.

To stop recording

To stop quick-timer recording while the VCR is recording a programme, press TIMER REC ON/OFF to turn off the TIMER REC indicator on the VCR.

To extend the recording duration while recording

Press QUICK TIMER until the desired duration appears in the display window

Note

- If you are using the VCR to record while watching another programme, you cannot use a satellite tuner.

Note

- If you set HI-FI AUDIO to STD, the standard sound is recorded on both the hi-fi and normal audio tracks. (You cannot select the listening sound using AUDIO MONITOR.)

Watching a TV programme while recording another

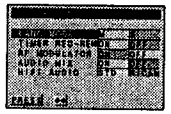
You can watch a TV programme and record another at the same time.

1 Press TV/VTR on the top right of the remote commander to turn off the VTR indicator in the display window.
2 Select the desired programme position on the TV.

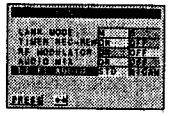
Recording stereo and bilingual programmes: in NICAM system

This VCR receives and records stereo and bilingual programmes based on the NICAM system. When NICAM broadcasts are received, the NICAM indicator appears in the display window; when stereo broadcasts are received, the STEREO indicator appears; when bilingual broadcasts are received, "MAIN/L" appears in the display window.

1 Press MENU and select SET UP MENU.



2 Set HI-FI AUDIO to NICAM by pressing CURSOR ↑/↓/←/→.



3 Press EXECUTE to store the setting.

Using the NICAM setting, NICAM broadcasts are recorded as in the following table.

Track	Sound recorded	
	Stereo	Bilingual
Hi-fi audio Left channel	Left channel	Main
Hi-fi audio Right channel	Right channel	Sub
Normal audio (monaural)	Standard	Standard

Recording TV programmes (continued)

To monitor stereo and bilingual programmes while recording
Set HIFI AUDIO to NICAM. Press AUDIO MONITOR to select the desired sound.

Stereo programmes

To listen to	Press AUDIO MONITOR until	
	The TV screen shows	The display window indicator shows
Stereo sound	"STEREO"	"STEREO"
Standard sound	No indication	No indication

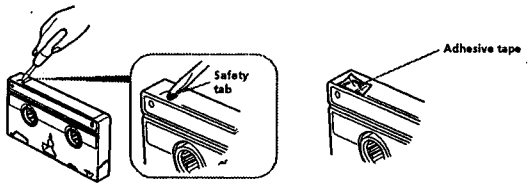
Bilingual programmes

To listen to	Press AUDIO MONITOR until	
	The TV screen shows	The display window indicator shows
Main sound	"MAIN"	"MAIN/L"
Sub sound	"SUB"	"SUB/R"
Main and sub sounds	"MAIN/SUB"	"MAIN/L, SUB/R"
Standard sound	No indication	No indication

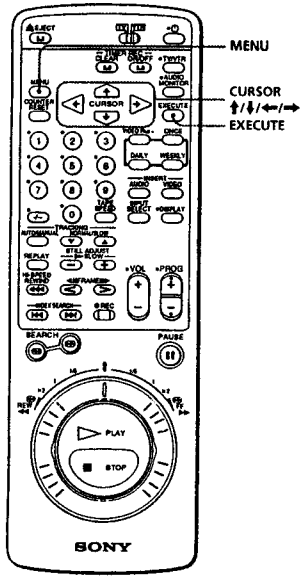
Saving a recording

Video tapes have a safety tab to protect against accidental recording. To prevent accidental erasure of a recording, break off the safety tab with a screwdriver or other tool. A tape with its safety tab removed ejects if you try to record on it.

To record on a tape with its safety tab removed, cover the tab hole with adhesive tape.



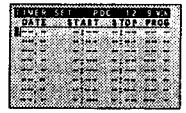
Recording TV programmes using the timer



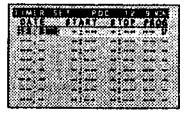
This section shows you how to let the VCR automatically start and stop recording TV programmes. You can preset up to eight programmes within a one month time frame.

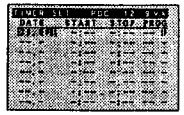
Before you start...
- Check that the clock is set correctly.
- Insert a tape with its safety tab in place. Make sure the tape is longer than the total recording time.
- Turn on your TV and tune in to the VCR.

1 **Press MENU and select TIMER SET/CHECK, then press EXECUTE.**
A short beep alerts you if the clock needs to be set.

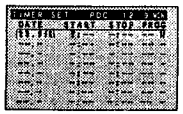


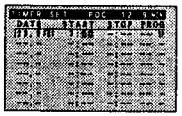
2 **Set the date to start recording:**
1 Press CURSOR ➡.
Make sure today's date is highlighted. If it isn't, reset the clock to the correct time.
2 Press CURSOR ↑ to set the date and month.
The day of the week is set automatically.
To record the same programme every day or the same day once a week, see "Daily/weekly recording" on page **25**.



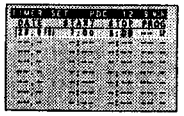


3 **Set the time to start recording:**
1 Press CURSOR ➡ to highlight the hour under "START," then press CURSOR ↑/↓ to set the hour.
2 Press CURSOR ➡ to highlight the minutes under "START," then press CURSOR ↑/↓ to set the minutes.





4 **Press CURSOR ➡, then set the time to stop recording in the same way.**



(continued)

Recording TV programmes using the timer (continued)

Tips
- To set the channel, you can also use the PROG +/– or number buttons.
- To record video sources from LINE IN 1, 2, or 3 jacks, press INPUT SELECT to display "L1," "L2," or "L3" in the "PROG" position.

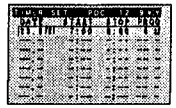
Tip
- To set the recording tape speed, you can also use TAPE SPEED.

Tip
- To change or correct a setting before confirming it, press CURSOR ➡ to highlight the item you want to change and reset it.

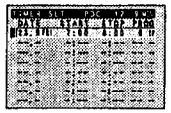
Notes
- If the power is interrupted for more than one hour while the VCR is standing by for recording, the timer settings are cleared. Reset the timer.

5 ***Press CURSOR ➡, then press CURSOR ↑/↓ to select the programme you want to record.***
Only the channels preset in the VCR will appear.

6 **Press CURSOR ➡, then press CURSOR ↑/↓ to select the tape speed, SP (standard play) or LP (long play).**
See "To select tape speeds" on page 20.



7 **To confirm your programme, press CURSOR ➡.**
All the settings stop being highlighted and the cursor (▮) appears in the leftmost column.
To preset another timer setting, move the cursor to the next line using CURSOR ↓ and repeat steps **2** to **7**.



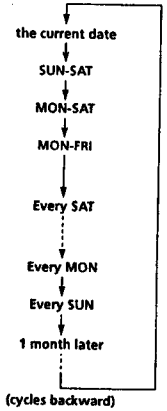
8 **After making the desired timer settings, press EXECUTE.**

9 **Press TIMER REC ON/OFF.**
The TIMER REC indicator on the VCR lights up and the VCR turns off and stands by for recording.
The VCR automatically turns on and starts recording at the preset start time, and turns off at the preset stop time.

To stop recording
To stop while the VCR is recording a program, press TIMER REC ON/OFF to turn off the TIMER REC indicator on the VCR.

To use the VCR while recording
You can do the following tasks during timer recording.

To	Press
Reset the counter to "0H00M00S"	COUNTER RESET
Display tape information on the TV screen	DISPLAY
Check the timer settings	MENU, and select TIMER SET/CHECK
Watch another TV programme	TV/VTR (See "Watching a TV programme while recording another" on page **21**.)



Notes
- If recording times overlap due to a PDC timer shift, the programme that was broadcast first has priority. The second programme will begin to record only when the first programme has finished.
- If the PDC signal is too weak or the broadcasting station failed to transmit PDC signals, the VCR will record the programme without using the PDC function even if the PDC indicator is lit in the display window.

Using the VCR before timer recording begins

Press TIMER REC ON/OFF to turn off the TIMER REC indicator on the VCR, then press ⏻ (on/standby). The VCR is ready for use.

After using the VCR, press TIMER REC ON/OFF again to turn on the TIMER REC indicator on the VCR. Remember to reset the VCR to stand by for recording before the time you've set the VCR to start recording, or the timer setting will be cancelled.

Daily/weekly recording

Daily recording records the same programme every day of the week; weekly recording records the same programme on the same day, every week.

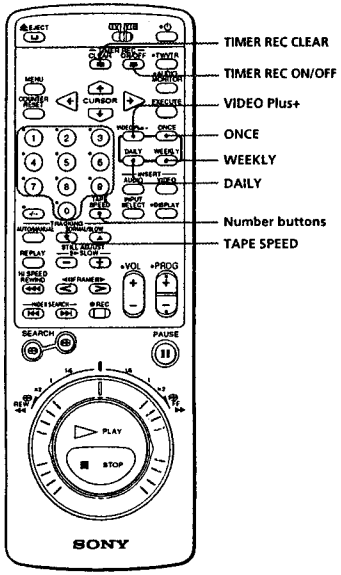
When you set the date to start recording in step **2** of "Recording TV programmes using the timer," press CURSOR ↓ until the desired day appears. Each time you press the button, the indication changes as shown on the left.

Timer recording with PDC signals

The broadcast system transmits PDC (Programme Delivery Control) signals with its TV programmes. These signals ensure that your timer recordings are made regardless of broadcast delays, early starts or broadcast interruptions. When setting the timer, make sure to enter the start and stop times exactly as indicated in the TV programme guide, otherwise the PDC function will not work.

1 If the TIMER REC indicator on the VCR is lit, press TIMER REC ON/OFF on the VCR to release the VCR from standby and turn off the indicator.
2 Press ⏻ to turn on the VCR.
3 Press PDC on the VCR.
The PDC indicator lights up in the display window.
4 If you turned off the TIMER REC indicator in step **1**, press TIMER REC ON/OFF on the VCR.
The VCR returns to recording standby. Once you switch on the PDC function, it works on all timer settings that are set to programmes with PDC signals.

Recording TV programmes using VIDEO Plus+

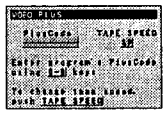


This section shows you another way of timer recording: recording using VIDEO Plus+. This allows you to record TV programmes more easily. Just enter the programme's "PlusCode," and the VCR will automatically record the programme. You can preset up to eight programmes within a one month time frame.

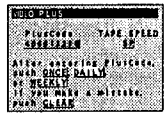
Before you start...

- Check that the clock is set correctly.
- Insert a tape with its safety tab in place. Make sure the tape is longer than the total recording time.
- Turn on your TV and tune in to the VCR.

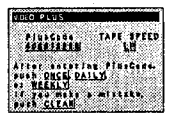
1 **Press VIDEO Plus+.**
A short beep alerts you if the clock needs to be set.



2 **Enter the desired programme's PlusCode using the number buttons.**
If you make a mistake, press TIMER REC CLEAR and enter the PlusCode again.



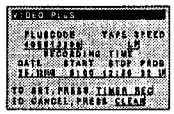
3 **Select the tape speed, SP (standard play) or LP (long play), by pressing TAPE SPEED.**



4 **Press ONCE, DAILY or WEEKLY according to the following:**

To record the programme	Press
Only once	ONCE
Monday to Friday at the same scheduled time	DAILY
Every week at the same scheduled time	WEEKLY

The recording information appears on the TV screen: date, program start and stop times, programme position number and tape speed. Check that the information is correct. If not, press TIMER REC CLEAR. To preset another timer setting, repeat steps **1** to **4**.



Tip

- If you've entered the wrong PlusCode, press TIMER REC CLEAR and start again from the beginning.

Note

- If the power is interrupted for more than one hour while the VCR is standing by for recording, the timer settings are cleared. Reset the timer.

Notes

- You cannot set VIDEO Plus+ in the following cases:
  - When the VCR is turned off.
  - While recording using the timer or quick timer.
- The timer will not accept settings in the following cases:
  - When you select DAILY for a Saturday and Sunday program.
  - When you select DAILY or WEEKLY for a programme more than seven days ahead.
  - When you enter the PlusCode of a programme that has already ended.

5 **Press TIMER REC ON/OFF.**
The TIMER REC indicator on the VCR lights up and the VCR stands by for recording.
The VCR automatically turns on, records the programme and turns off.

To record satellite broadcasts

1 Turn on the satellite tuner.
2 On the satellite tuner, select the satellite programme for which you wish to make a timer setting.
3 Repeat the steps described above.
4 Keep the satellite tuner turned on until the VCR finishes recording the satellite programme for which you have made a timer setting.

To stop recording

To stop while the VCR is recording a programme, press TIMER REC ON/OFF to turn off the TIMER REC indicator on the VCR.

To use the VCR while recording

You can do the following tasks while recording using VIDEO Plus+.

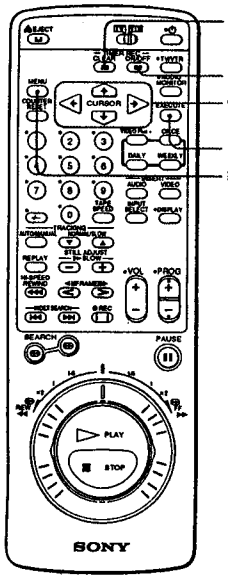
To	Press
Reset the counter to "0H00M00S"	COUNTER RESET
Display tape information on the TV screen	DISPLAY
Check the timer settings	MENU and select TIMER SET/CHECK
Watch another TV programme	TV/VTR (See "Watching a TV programme while recording another" on page **21**.)

Using the VCR before recording begins

Press TIMER REC ON/OFF to turn off the TIMER REC indicator on the VCR, then press ⏻ (on/standby). The VCR is ready for use.

After using the VCR, press TIMER REC ON/OFF again to turn on the TIMER REC indicator on the VCR. Remember to reset the VCR to stand by for recording before the recording programme begins, or the setting will be cancelled.

Checking/changing/ cancelling timer settings

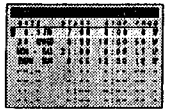


This section shows you how to check, change and cancel the timer settings after you've stored them in the VCR.

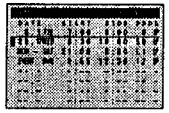
Before you start...
Turn on your TV and tune in to the VCR.

1 **Press TIMER REC ON/OFF to turn off the TIMER REC indicator on the VCR.**

2 **Press ⏻ (on/standby) to turn on the VCR, then press MENU and select TIMER SET/CHECK. Then press EXECUTE.**



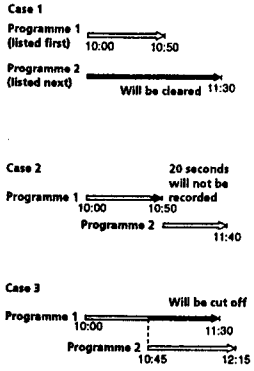
3 **Check the timer settings:**
- If you do not want to change or cancel the settings, press EXECUTE, then press TIMER REC ON/OFF to return to recording standby.
- If you want to change or cancel the settings, press CURSOR ↑/↓ to move the cursor (▮) to the setting you want to change or cancel.



4 **Change or cancel the timer setting:**
- To change the setting, press CURSOR → to highlight the item you want to change, and reset it using CURSOR ↑/↓. Then, press CURSOR → to move the cursor to the leftmost column.
- To cancel the setting, press TIMER REC CLEAR.

5 **Press EXECUTE.**
The VCR returns to the original screen. When there are any other timer settings left in the TIMER SET/CHECK menu, turn the VCR off to return to recording standby.

To check the timer settings during timer recording
Press MENU and select TIMER SET/CHECK. After checking, press EXECUTE to turn off the display.



When the timer settings overlap

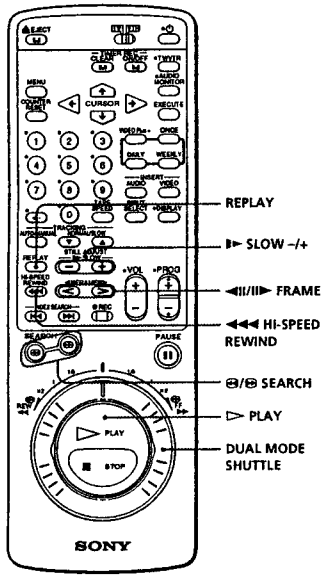
The VCR will not record overlapping programmes. If any of your timer settings overlap, change the settings.

Case 1: If you preset two programmes to start recording at the same time...
The programme listed first in the TIMER SET/CHECK menu has priority over the other programmes. The timer settings of lower priority programmes will be erased from the TIMER SET/CHECK menu when the first programme begins recording.

Case 2: If you preset programme 2 to start recording at the same time you preset programme 1 to finish recording...
The last 20 seconds of programme 1 will not be recorded because the VCR will enter recording pause for programme 2 before programme 1 is finished.

Case 3: If you preset programme 2 to start recording before programme 1 is finished recording...
Programme 2 will start recording before programme 1 has finished.

Playing/searching at various speeds



You can play back a tape at various speeds: high-speed, slow motion, frame by frame and so on. These options are also useful for searching for a specific point during playback. The sound is muted during these operations.

Playback options	Operation	To resume normal playback
Playing at various speeds: One-fifth the normal speed Twice the normal speed High speed	During playback, turn the DUAL MODE SHUTTLE ring right or left to: 1/5 X2 ⊖ or ⊖	Release the ring.
Fast-forwarding/ Rewinding	During stop, turn the DUAL MODE SHUTTLE ring to ▶▶ FF or to ◀◀ REW and release.	Press ▷ PLAY.
Viewing the picture during fast-forward or rewind	During fast-forward, turn the DUAL MODE SHUTTLE ring to ▶▶ FF. During rewind, turn the ring to ◀◀ REW.	To return to the previous mode, release the ring.
Locking in a high-speed picture	During playback or pause, press ⊖ SEARCH or ⊖ SEARCH. To change direction, press ◀II FRAME (backward) or II▶ FRAME (forward).	Press ▷ PLAY.
Locking in a slow-motion picture	During playback or pause, press I▶ SLOW –/+. To change direction, press ◀II FRAME (backward) or II▶ FRAME (forward).	Press ▷ PLAY.
Playing frame by frame	During pause, press II▶ FRAME to advance the picture one frame or ◀II FRAME to reverse the picture one frame.	Press ▷ PLAY.
Playing in reverse	During playback, press ◀II FRAME.	Press ▷ PLAY.

Tip

- Adjust the picture using the ▼/▲ TRACKING NORMAL/SLOW STILL ADJUST buttons if:
  - Streaks appear while playing in slow motion.
  - Bands appear on the top or bottom while pausing.
  - The picture shakes while pausing.

Note

- If you use these functions in the LP mode, noise may appear or there may be no colour.

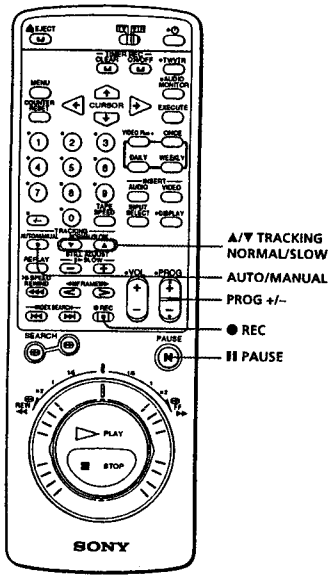
Note

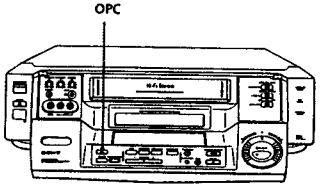
- When rewinding at high speed, you will not see the time counter.

Playback options	Operation	To resume normal playback
Replaying a scene	During playback or pause, press REPLAY and hold it down until the desired scene appears. When you release the button, the scene is played back in slow motion.	Press ▷ PLAY or II PAUSE.
Rewinding at high speed	Press ◀◀◀ HI-SPEED REWIND.	Press ▷ PLAY.
Rewind and restart play	During stop, press ▷ PLAY on the VCR while holding the DUAL MODE SHUTTLE ring on the VCR at the ◀◀ REW position, or while pressing down ◀◀◀ HI-SPEED REWIND on the VCR.	——

Adjusting the picture

The VCR automatically adjusts the picture for the best possible playback or recording. If, however, you find the automatic adjustment unsatisfactory, you can adjust the picture manually.





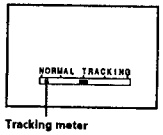
Notes

- Tapes recorded using the OPC function are played back normally on VCRs that do not have the OPC function.
- Press II PAUSE to release recording after the OPC indicator stops flashing. If you start recording before the OPC indicator stops flashing, the OPC function is cancelled.

Adjusting the tracking

Though the VCR automatically adjusts the tracking when playing a tape (the AUTO TRACKING indicator flashes in the display window, then lights steadily), distortion may occur if the tape was recorded in poor condition. If so, manually adjust the tracking condition.

Press the ▼/▲ TRACKING NORMAL/SLOW buttons to display the tracking meter. The distortion should disappear as you press one of the two buttons. If you cannot get a clear picture with manual adjustment, press TRACKING AUTO/MANUAL to return to automatic adjustment.



Tracking meter

About Optimum Picture Control (OPC)

Optimum Picture Control (OPC) automatically improves recording and playback quality by adjusting the VCR to the condition of the video heads and tape. To maintain better picture quality, we recommend that you leave OPC on (with the OPC indicator in the display window lit).

To use OPC during playback

The OPC function automatically works on all types of tapes, including rental tapes. You can play a tape using the OPC function even if the tape was not recorded with it.

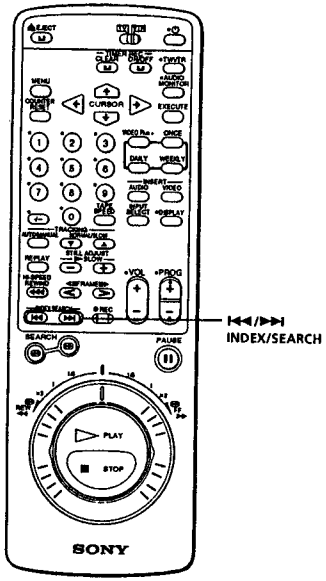
To use OPC while recording

Whenever you insert a tape and first start recording, the VCR adjusts to the tape using the OPC function (the OPC indicator flashes rapidly). This adjustment is retained until the tape is ejected. There is a short delay before the VCR actually starts recording while the VCR analyzes the tape.

If you want to start recording precisely the first time you record, set the VCR to recording pause mode (the OPC indicator flashes slowly) and press ● REC to let the VCR analyze the tape. When the OPC indicator stops flashing, press II PAUSE to start recording. Recording begins immediately.

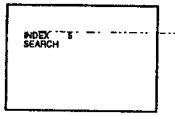
Searching using the index function

The VCR automatically marks an index signal at the point where recording starts (with the exception of when you start recording from recording pause). Use this as a reference to find the beginning of the recording. Since the index number indicates the relative position from the current position, specify how many index signals ahead or behind the specific index signal is from the current position.



1 **Insert an indexed tape into the VCR.**

2 **Press the I◀◀/▶▶I INDEX SEARCH buttons repeatedly until the index number you want appears on the TV screen:**



- To locate succeeding programmes, press ▶▶I INDEX SEARCH.
- To locate preceding programmes, press I◀◀ INDEX SEARCH.

The VCR starts searching and the index number on the TV screen counts down to zero. Playback starts automatically from that point.

Looking at menu options

The SET UP MENU provides you with various options to set up and customise your VCR. See the table below for the available menu choices. Initial settings are indicated in bold letters.

Menu choices

Menu option	Set this option to
LANC MODE	• M to control another VCR with this VCR using the LANC connector. • **S** to control this VCR with another VCR.
TIMER REC-REW	• ON to automatically rewind the tape after all timer settings have been recorded. • **OFF** to cancel this setting.*
RF MODULATOR	• **ON** if you have connected the VCR to your TV using only the aerial cable. • OFF if you have connected the VCR to your TV using the EURO-AV cable.
AUDIO MIX	• ON to listen to the hi-fi and normal audio tracks at the same time. The AUDIO MONITOR button becomes inoperable. • **OFF** to select the sound using the AUDIO MONITOR button. For details, see page **38**.
HI-FI AUDIO	• **NICAM** to record NICAM broadcasts on a hi-fi audio track. • STD to record standard sound on a hi-fi audio track. For details, see page **21**.

* If the tape has been recorded to the end, the VCR rewinds it regardless of this setting.

Tip
- See "How sound is recorded on a video tape" on page **18**.

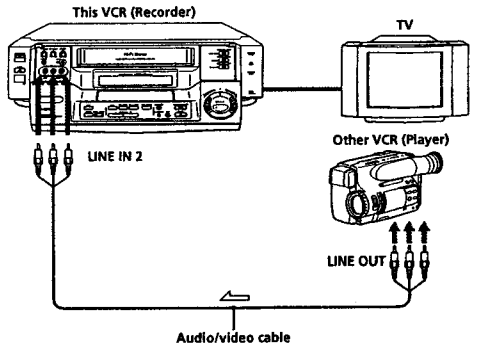
1-17

Editing

Editing with another VCR

This section shows you how to edit to or from another VCR or camcorder. You can make a copy of a tape using this VCR for recording or playback.

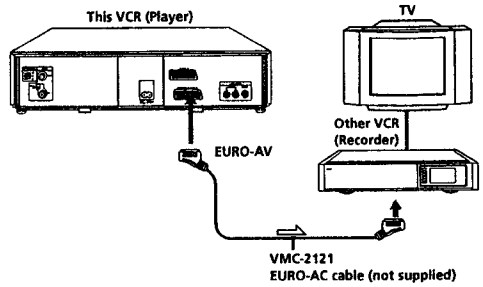
How to hook up to record on this VCR



: Signal flow

Tips
- Make sure you connect the plugs to jacks of the same colour.
- If the other VCR is a monaural type, leave the red plugs unconnected.

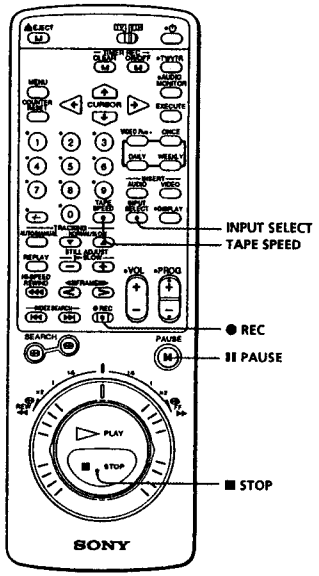
How to hook up to record on another VCR



: Signal flow

Tip
- If the other VCR doesn't have a EURO-AV (Scart) connector, use the VMC-2106 EURO-AV cable instead and connect the cable to the line in jacks of the other VCR.

Editing with another VCR
(continued)



Operation (when recording on this VCR)

Before you start editing

- Press INPUT SELECT to display "L2" in the display window.
- Press TAPE SPEED to select the recording tape speed (SP/LP).
- On this VCR, press EDIT on the VCR so that the EDIT indicator lights in the display window.
  If the other VCR has a similar switch, set it to ON as well.

1 **Insert a source tape with its safety tab removed into the other (playback) VCR. Search for the point to start playback and set it to playback pause.**

2 **Insert a tape into this (recording) VCR. Search for the point to start recording and press II PAUSE.**

3 **Press ● REC on this VCR and set it to recording pause.**

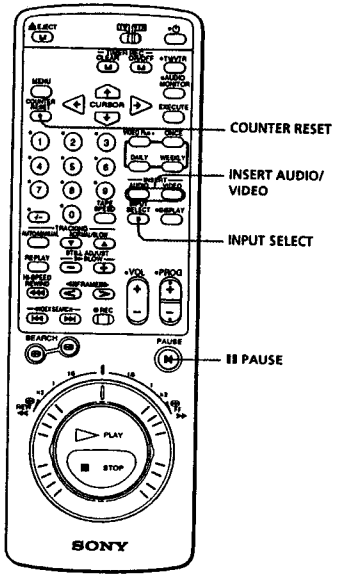
4 **To start editing, press the II PAUSE buttons on both VCRs to release the VCRs from pause.**
For best results, press the pause button on the other VCR before pressing II PAUSE on this VCR.

To stop editing
Press the ■ STOP buttons on both VCRs.

Tips

- To make your editing more precise, use the pause buttons on both VCRs.
- To cut out unwanted scenes while editing, press II PAUSE on this VCR when an unwanted scene begins. When it ends, press II PAUSE again to resume recording (Assemble Editing).

Insert editing



You can replace unwanted scenes with other scenes by recording pictures and/or sound over the prerecorded tape. With the video insert function, the original video and hi-fi sound are replaced while the original monaural sound is retained. With the audio insert function, the original monaural sound is replaced. The original video and hi-fi sound, however, are left intact.

Before you start editing

- Follow the instructions on page 35 to hook up your VCRs.
  To insert sound using a stereo system, see "To hook up with a stereo system" on the next page.
- Press INPUT SELECT to display "L2" in the display window.

1 **Insert a source tape into the playback VCR or into the stereo system. Search for the point to start playback and set it to playback pause.**

2 **Insert the prerecorded tape into this (recording) VCR. Search for the end of the unwanted scene and press II PAUSE.**
Make sure that the tape has its safety tab in place so that you can dub pictures and/or sound onto it.

3 **Press COUNTER RESET on this VCR to reset the counter to "0H00M00S."**

4 **Rewind the tape to the beginning of the unwanted scene.**
This VCR pauses.

5 **Press the INSERT buttons according to the following:**

To insert	Press	So that
Both picture and sound	INSERT AUDIO, then INSERT VIDEO	"AV INS II" appears on the TV screen, and "A V INSERT" appears in the display window on the VCR.
Picture only	INSERT VIDEO	"V INS II" appears on the TV screen, and "V INSERT" appears in the display window on the VCR.
Sound only	INSERT AUDIO	"A INSERT" appears in the display window on the VCR.

Note

- You must be in playback pause mode before pressing an INSERT button. (If you are in recording pause mode, you cannot use the insert features.)

(continued)

Insert editing (continued)

6 To start editing, simultaneously press the II PAUSE buttons on this VCR and on the other VCR or stereo system.
When the counter of this VCR reaches "0H00M00S," editing stops automatically.

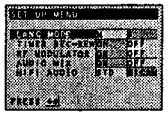
To stop editing
Press the ■ STOP buttons on this VCR and on the other VCR or stereo system.

To hook up with a stereo system
Connect LINE IN 2 AUDIO of this VCR and the audio out jacks of the stereo system, using the RK-C510 audio cable (not supplied). Display "LINE 2" on the TV screen using INPUT SELECT.

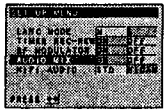
Listening to both audio tracks during playback

When playing an audio-dubbed tape, you have a choice of listening sound. To listen to the sounds recorded on the hi-fi audio and normal audio tracks at the same time, use the SET UP MENU.

1 Press MENU and select SET UP MENU.



2 Set AUDIO MIX to ON by pressing CURSOR ↑/↓/←/→.
The AUDIO MONITOR button becomes inoperative, and the sound you hear is mixed.



3 Press EXECUTE to store the setting.
After playing the audio-inserted tape, reset AUDIO MIX to OFF.

Tip
- See "How sound is recorded on a video tape" on page 18.

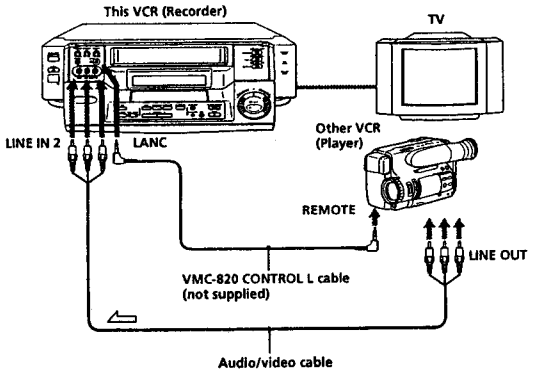
Note
- If AUDIO MIX remains ON, the AUDIO MONITOR button remains inoperative.

Synchronised editing

If your other VCR has a LANC ⇳* jack, connect the VCRs via the LANC ⇳ jack. This additional connection lets you control both VCRs from one VCR for easier editing.

* Also indicated as REMOTE or CONTROL L.

How to hook up via the LANC ⇳ jacks

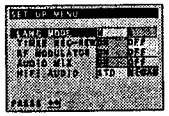


: Signal flow

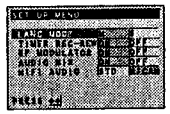
Setting the LANC mode

The LANC mode setting determines which VCR controls which. Here's how to control the other VCR from this VCR.

1 Press MENU and select SET UP MENU.



2 Set LANC MODE to M by pressing the CURSOR (↑/↓/←/→) buttons.
On the other VCR, set the LANC mode to S.



3 Press EXECUTE to store the setting.

To control this VCR from the other VCR
Set the LANC mode to S on this VCR and to M on the other VCR.

Synchronised editing *(continued)*

Operation (when recording on this VCR)

Before you start editing
- Press INPUT SELECT to display "L2" in the display window.
- Press TAPE SPEED to select the recording tape speed (SP/LP).

1 **Insert a source tape into the other (playback) VCR. Search for the point to start playback and set it to playback pause.**

2 **Insert a tape with its safety tab in place into this (recording) VCR. Search for the point to start recording and press II PAUSE.**

3 **Press ● REC on this VCR to pause for recording.**

4 **To start editing, press SYNCHRO EDIT on this VCR.**
The SYNCHRO EDIT indicator lights up on the VCR.

5 **At the point you want to stop recording, press SYNCHRO EDIT to stop editing.**
Both VCRs return to pause.

To stop editing
Press the ■ STOP buttons on both VCRs.

Notes
- You can't do synchronised editing on VCRs that do not have a LANC ⏻ connector.
- If the tape recording condition of the playback VCR is poor, this VCR may display a blue colour on the TV screen for a moment. This is not an indication of a malfunction.
- When you record a stereo/bilingual tape source from another VCR, set the audio output of that VCR to output both main and sub sounds.

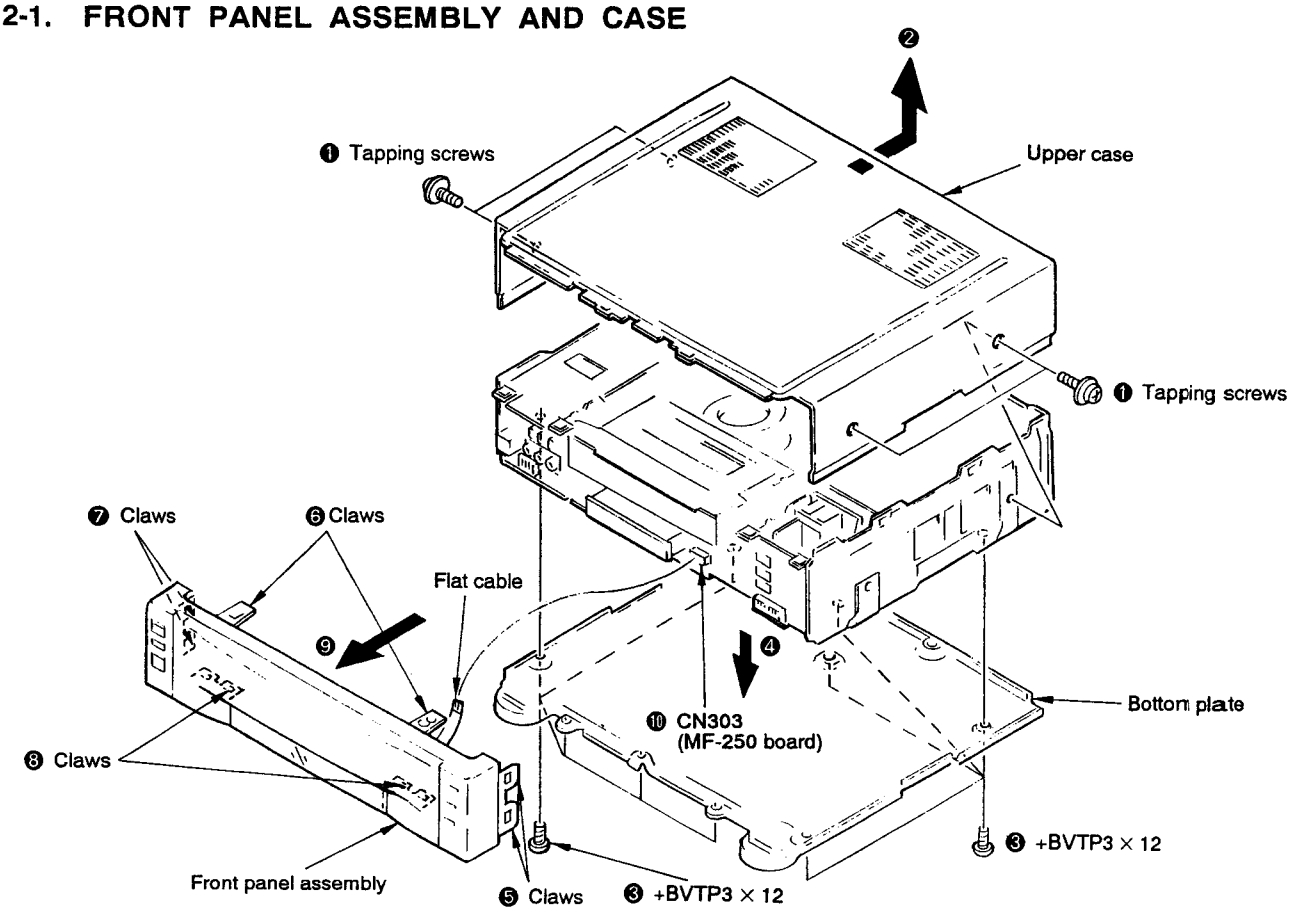
About LANC ⏻

LANC stands for Local Application Control System. The LANC ⏻ connector is used for controlling the tape transport of video equipment and peripherals connected to it. This connector has the same function as connectors indicated as CONTROL L or REMOTE.

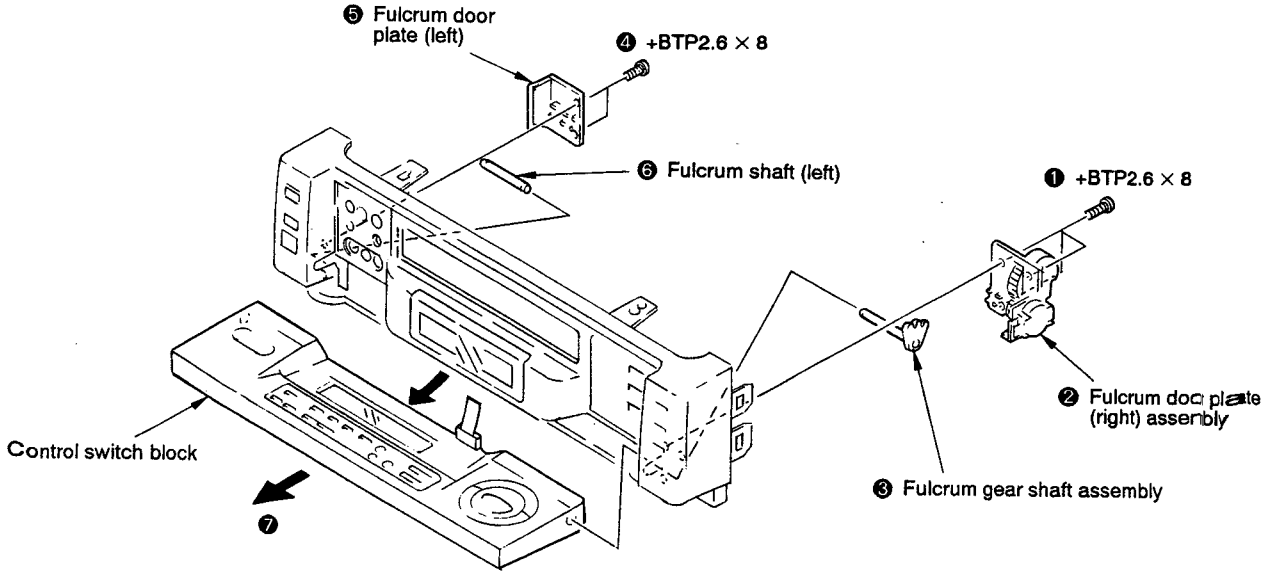
SECTION 2
DISASSEMBLY

Note: Follow the disassembly procedure in the numerical order given.

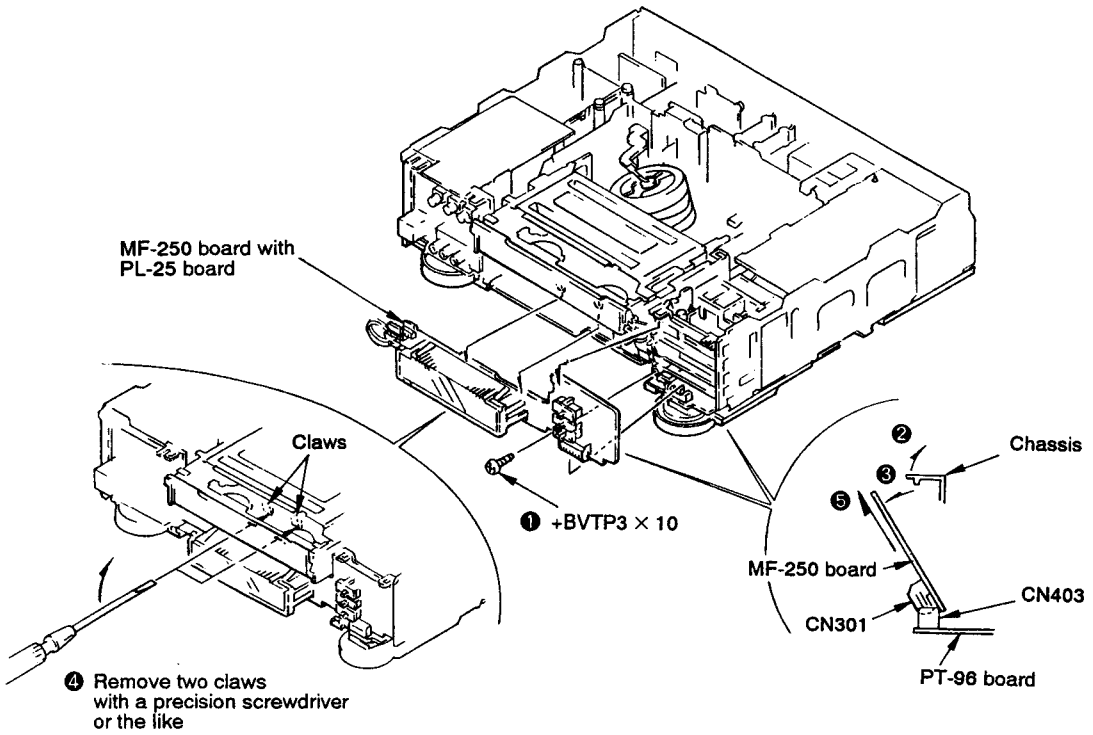
2-1. FRONT PANEL ASSEMBLY AND CASE



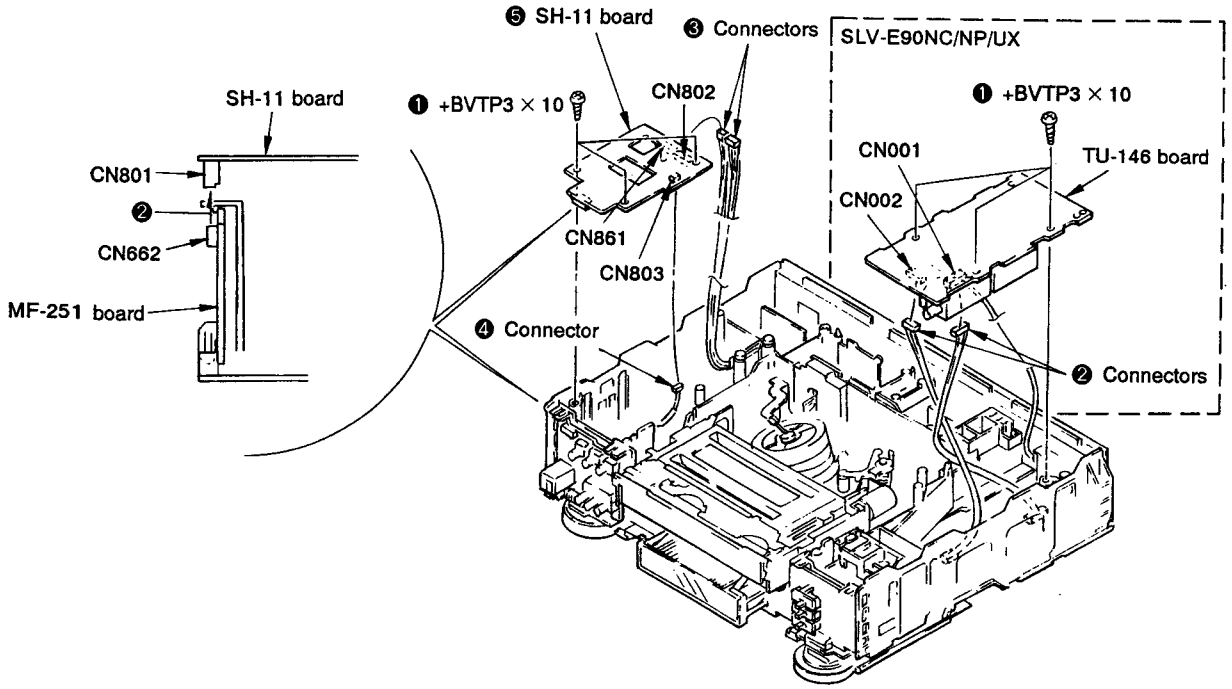
2-2. CONTROL SWITCH BLOCK



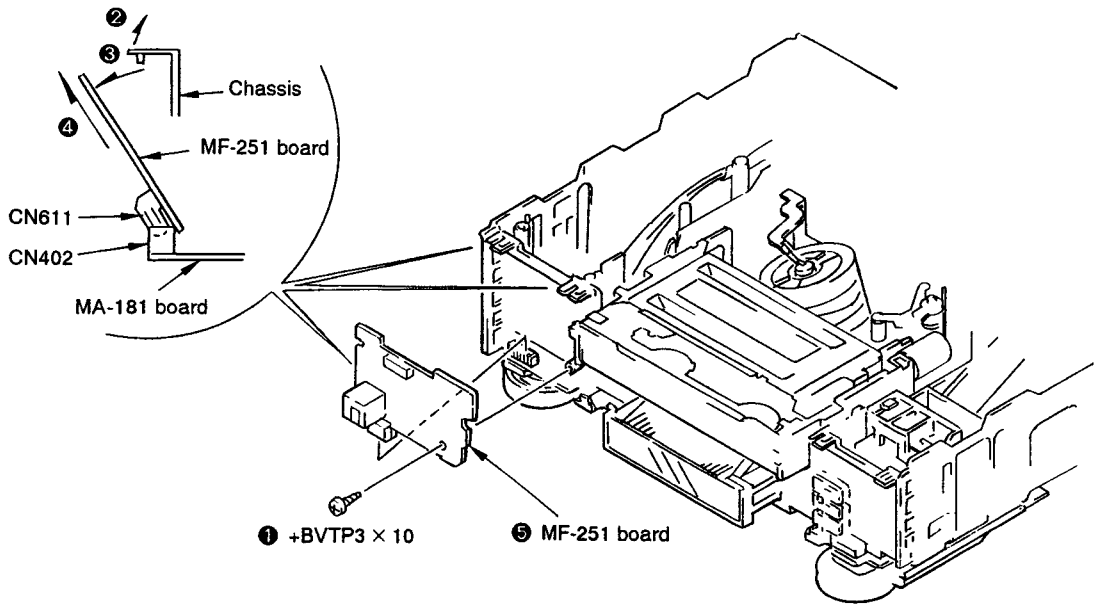
2-3. MF-250 BOARD WITH PL-25 BOARD



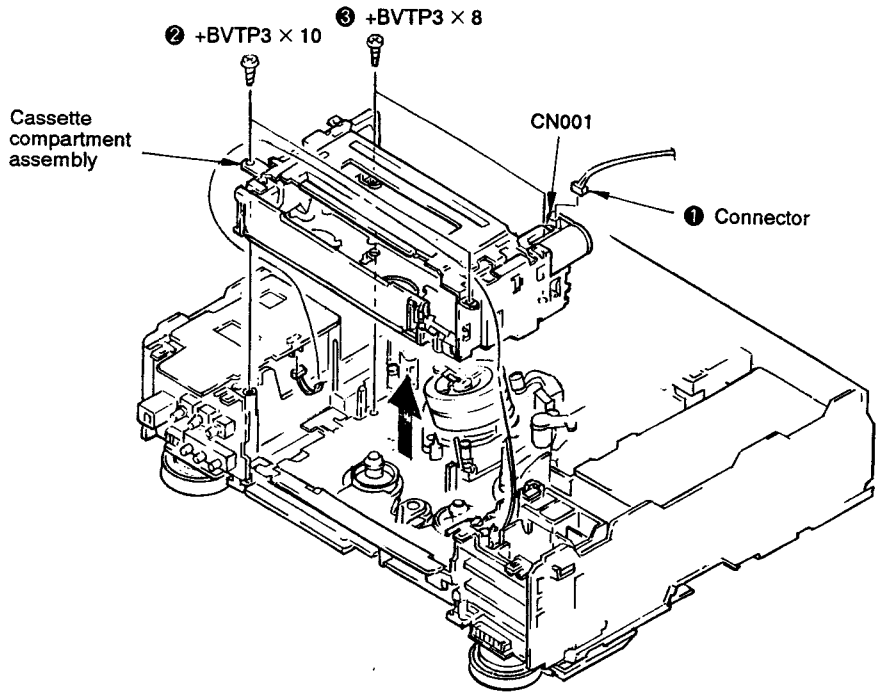
2-4. SH-11 BOARD AND TU-146 BOARD (SLV-E90NC/NP/UX)



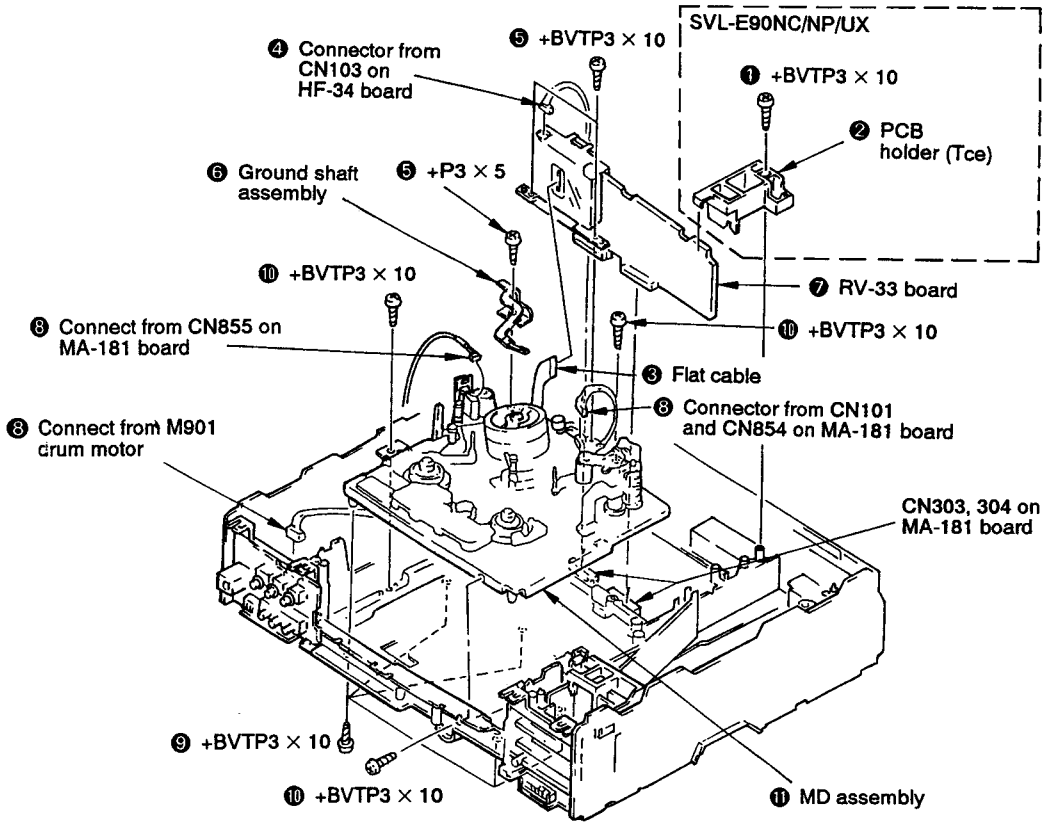
2-5. MF-251 BOARD



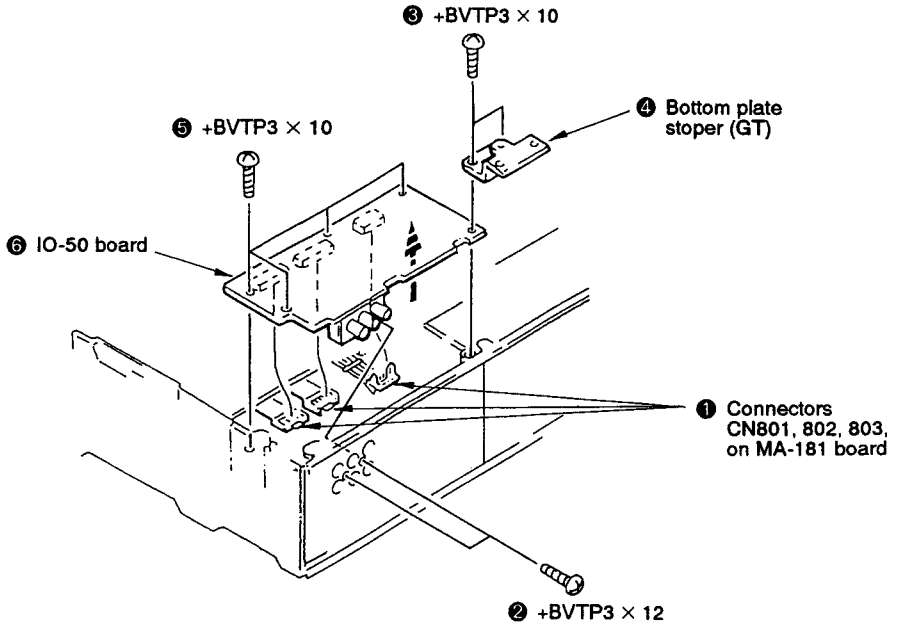
2-6. CASSETTE COMPARTMENT ASSEMBLY



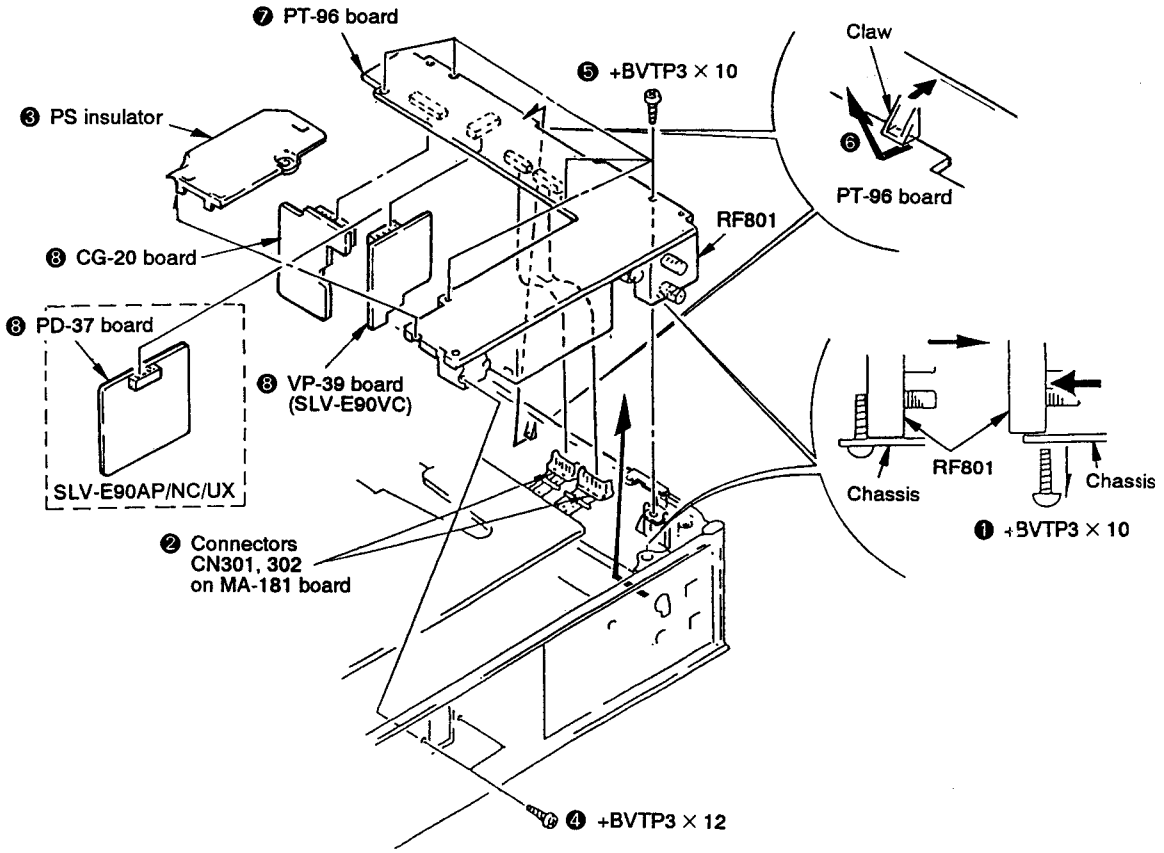
2-7. RV-33 BOARD AND MD ASSEMBLY



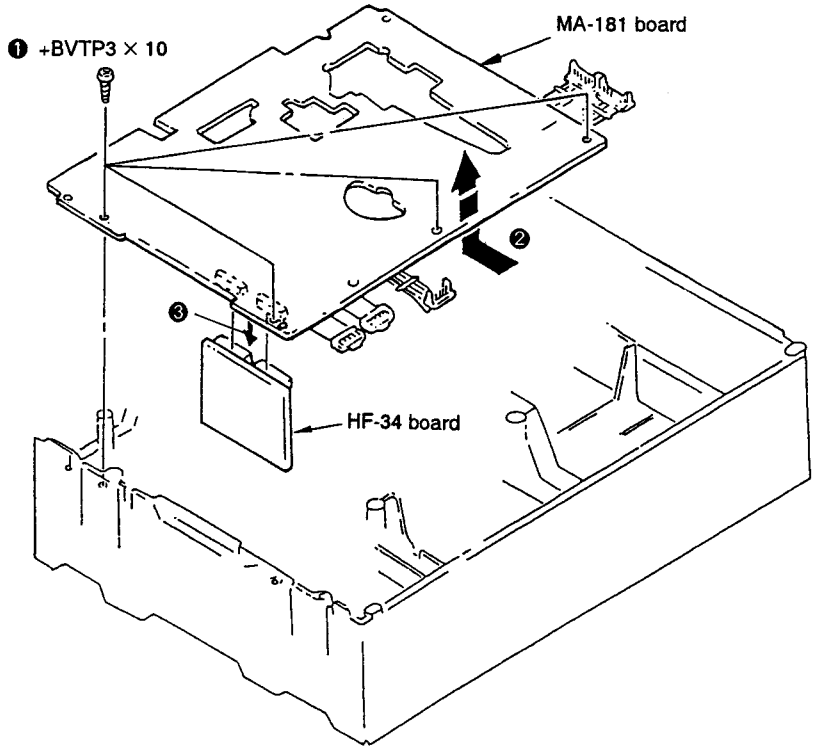
2-8. IO-50 BOARD



2-9. PT-96, CG-20, PD-37 (SLV-E90AP/NC/UX) AND VP-39 (SLV-E90VC) BOARDS

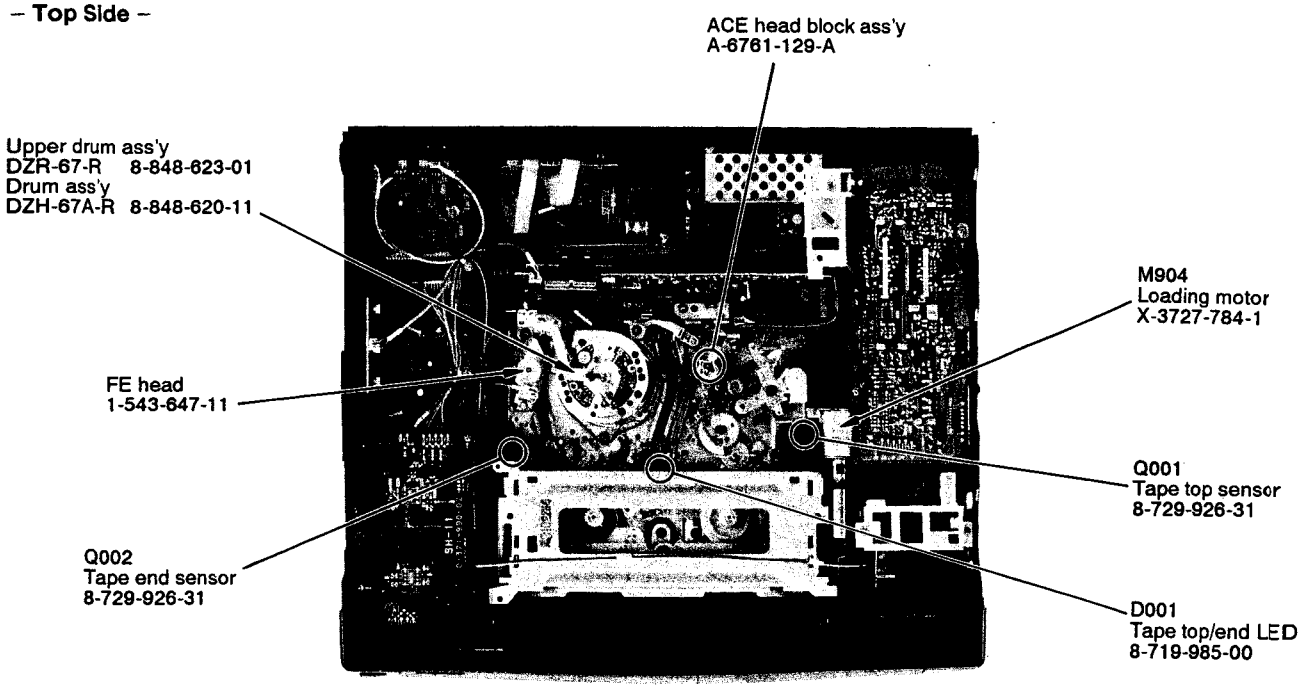


2-10. MA-181 AND HF-34 BOARDS

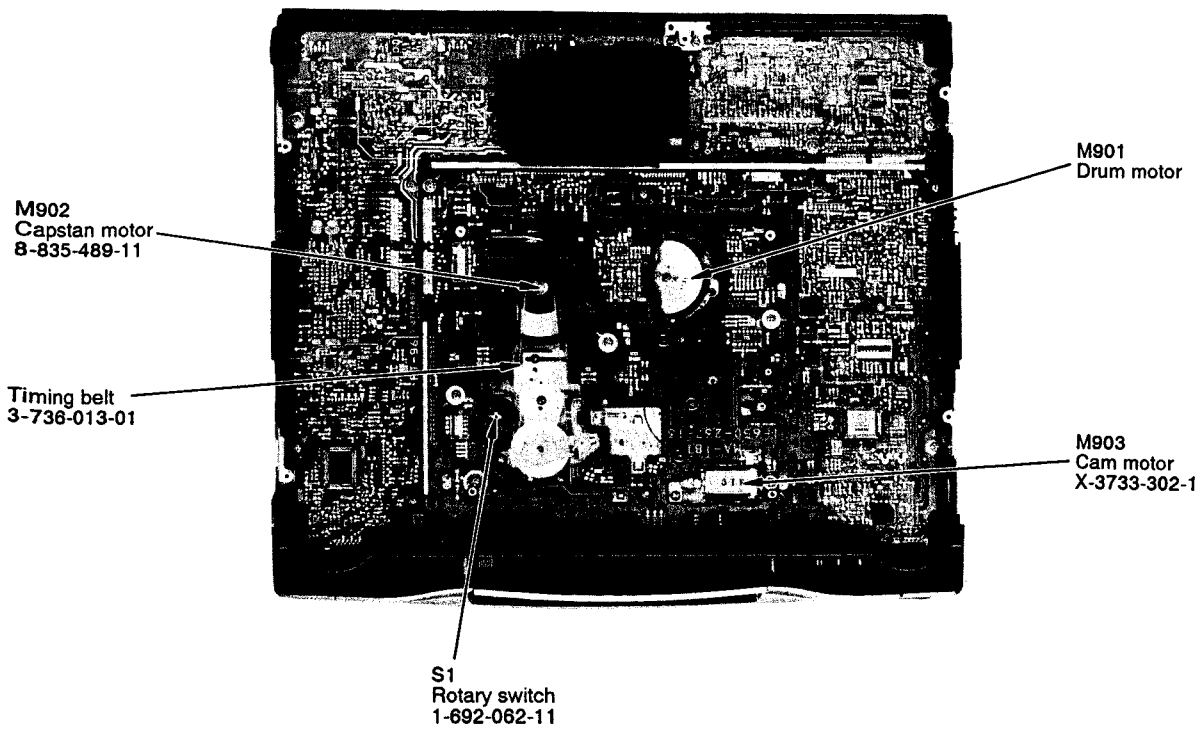


2-11. INTERNAL VIEWS

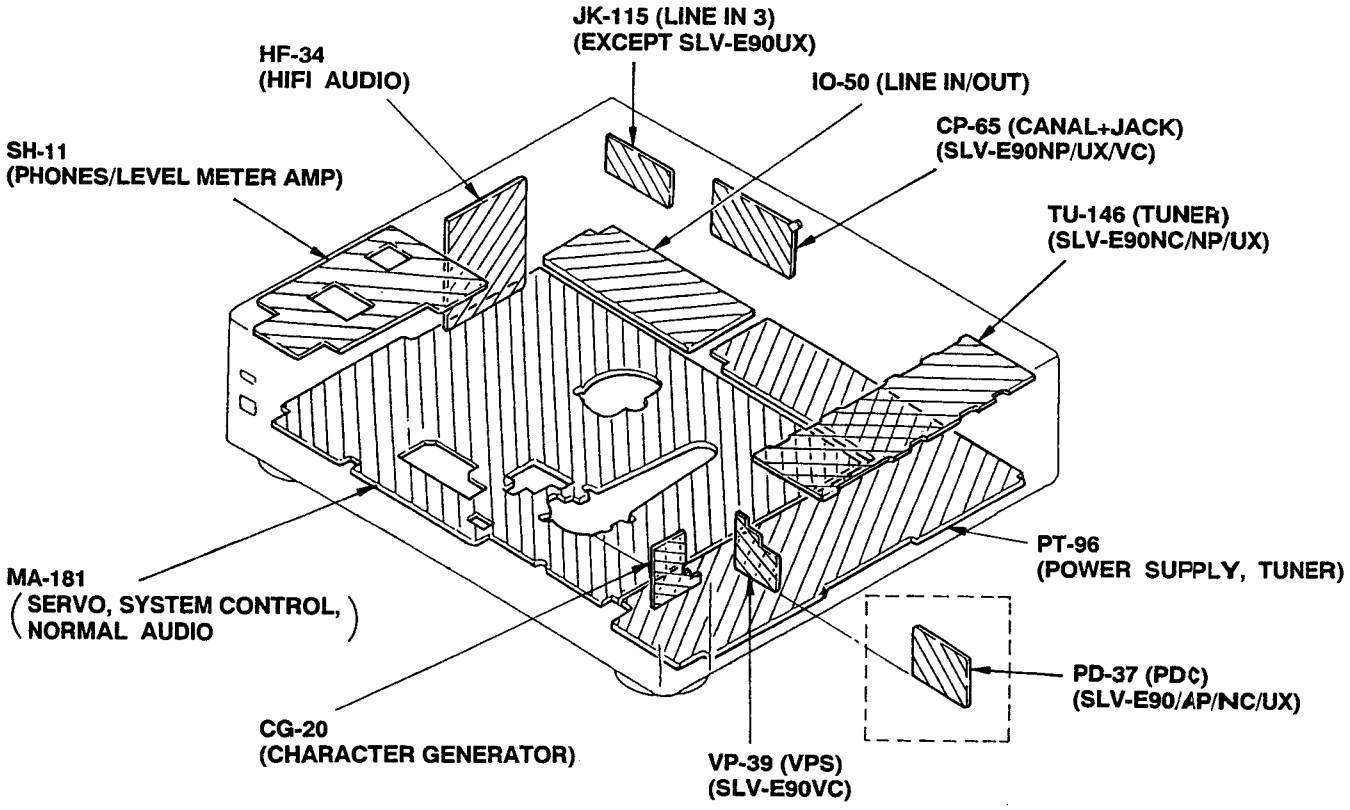
– Top Side –

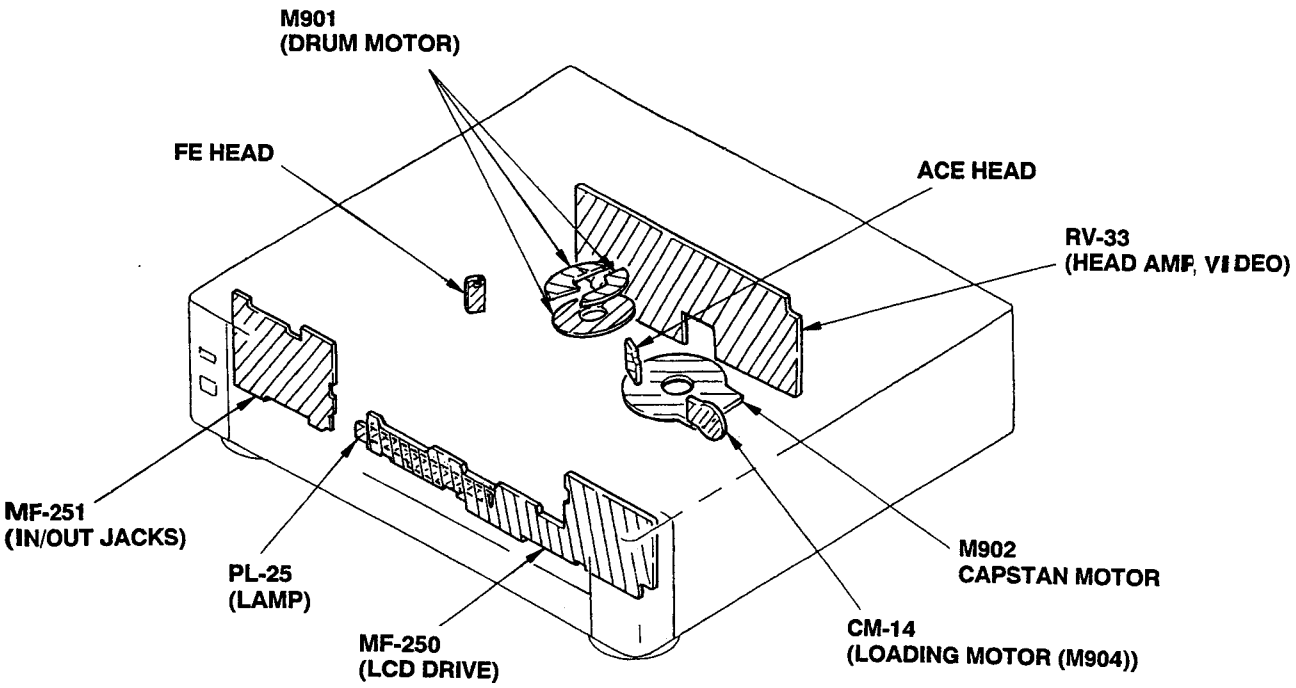


– Bottom Side –



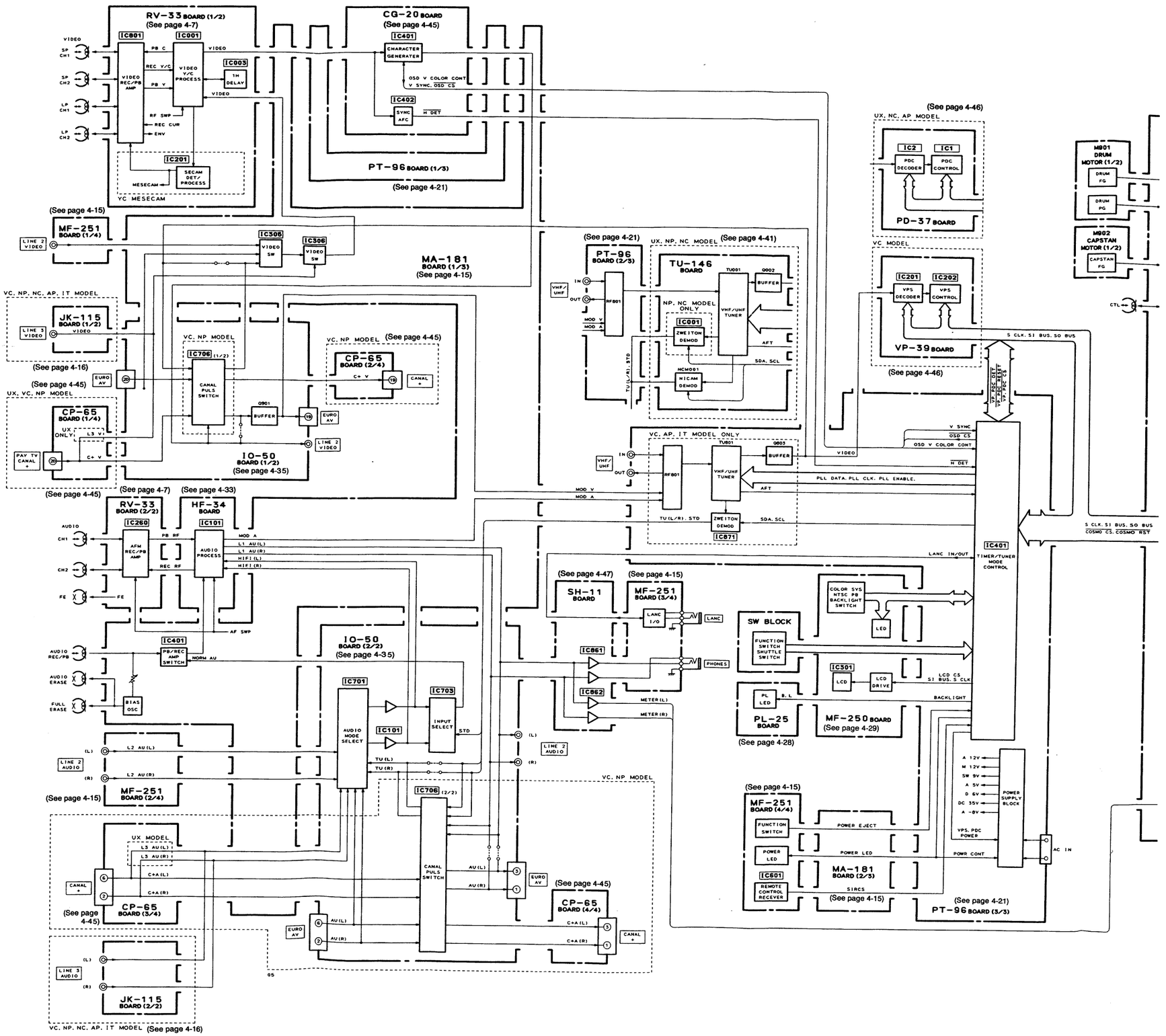
2-12. CIRCUIT BOARDS LOCATION

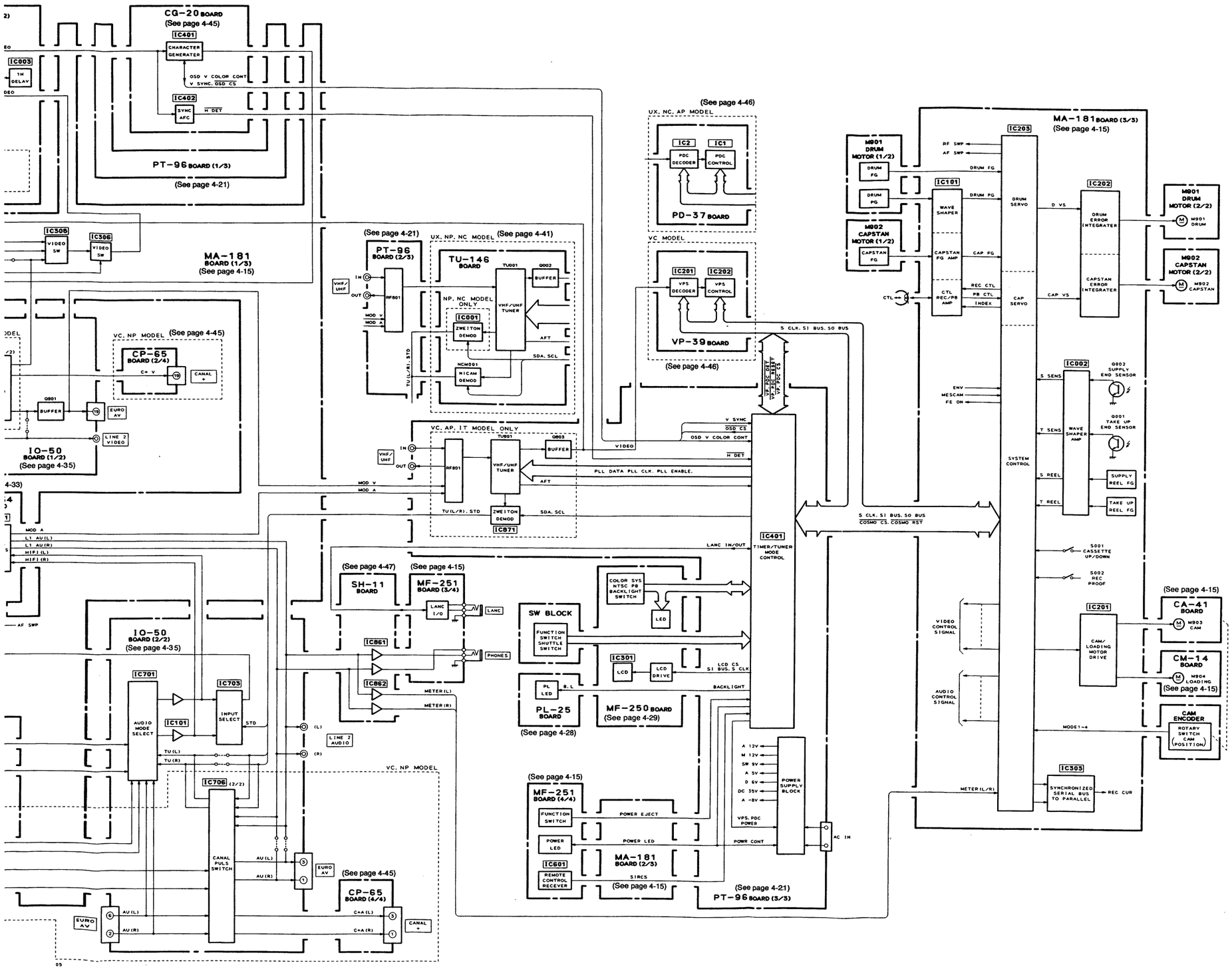




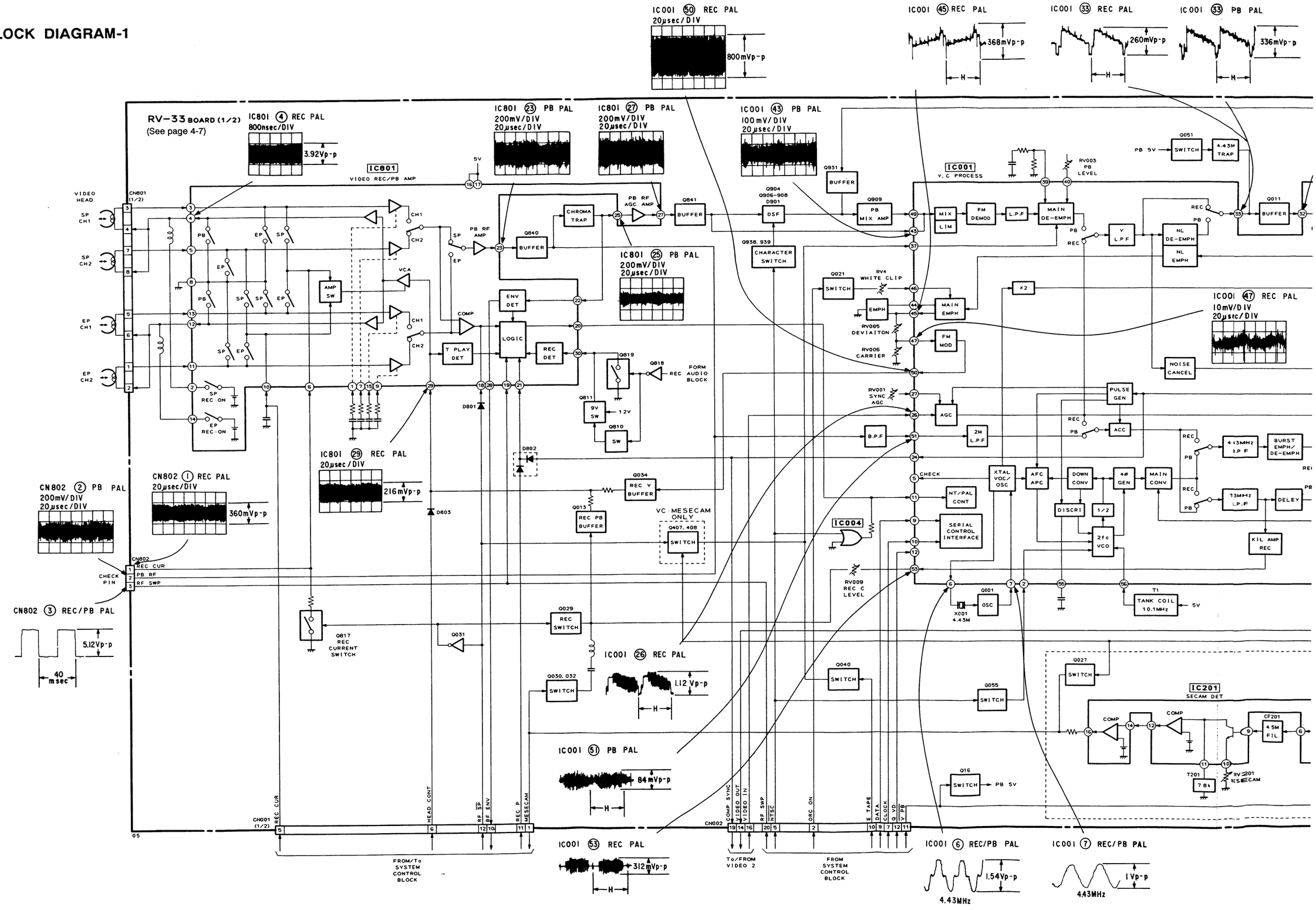
SECTION 3
BLOCK DIAGRAMS

3-1. OVERALL BLOCK DIAGRAM




CG-20 BOARD
(See page 4-45)
IC401
CHARACTER GENERATER
OSD V COLOR CONT
V SYNC, OSD CS
IC402
SYNC AFC
H DET
PT-96 BOARD (1/3)
(See page 4-21)
IC005
1H DELAY
IC306
VIDEO SW
MA-181
BOARD (1/3)
(See page 4-15)
VC, NP MODEL (See page 4-45)
CP-65
BOARD (2/4)
C+ V
CANAL +
Q901
BUFFER
EURO AV
LINE 2 VIDEO
IO-50
BOARD (1/2)
(See page 4-35)
(See page 4-21)
PT-96
BOARD (2/3)
UX, NP, NC MODEL (See page 4-41)
TU-146
BOARD
TU001
Q002
BUFFER
VHF/UHF
IN
OUT
RF801
MOD V
MOD A
NP, NC MODEL ONLY
IC001
ZWEITON DEMOD
VHF/UHF TUNER
AFT
SDA, SCL
NCM001
NICAM DEMOD
TU (L/R), STD
VC, AP, IT MODEL ONLY
Q003
PLL DATA PLL CLK. PLL ENABLE.
IC871
(See page 4-46)
UX, NC, AP MODEL
IC2
PDC DECODER
IC1
PDC CONTROL
PD-37 BOARD
VC MODEL
IC201
VPS DECODER
IC202
VPS CONTROL
VP-39 BOARD
(See page 4-46)
S CLK, SI BUS, SO BUS
VP-PDC DET
VP-PDC RST
VP-PDC CS
VIDEO
V SYNC
OSD V COLOR CONT
H DET
S CLK, SI BUS, SO BUS
COSMO CS, COSMO RST
IC401
TIMER/TUNER MODE CONTROL
LANC IN/OUT
M901 DRUM MOTOR (1/2)
DRUM FG
DRUM PG
M902 CAPSTAN MOTOR (1/2)
CAPSTAN FG
IC101
WAVE SHAPER
CAPSTAN FG AMP
CTL REC/PB AMP
RF SWP
AF SWP
DRUM FG
DRUM PG
CAP FG
REC CTL
PB CTL
INDEX
CTL
DRUM SERVO
CAP SERVO
SYSTEM CONTROL
ENV
MESCAM
FE ON
MA-181 BOARD (3/3)
(See page 4-15)
IC203
IC202
DRUM ERROR INTEGRATER
CAPSTAN ERROR INTEGRATER
D VS
CAP VS
M901 DRUM MOTOR (2/2)
M901 DRUM
M902 CAPSTAN MOTOR (2/2)
M902 CAPSTAN
IC002
WAVE SHAPER AMP
S SENS
T SENS
S REEL
T REEL
Q002 SUPPLY END SENSOR
Q001 TAKE UP END SENSOR
SUPPLY REEL FG
TAKE UP REEL FG
S001 CASSETTE UP/DOWN
S002 REC PROOF
IC201
CAM/ LOADING MOTOR DRIVE
VIDEO CONTROL SIGNAL
AUDIO CONTROL SIGNAL
(See page 4-15)
CA-41
BOARD
M903 CAM
CM-14
BOARD
M904 LOADING
(See page 4-15)
CAM ENCODER
ROTARY SWITCH (CAM POSITION)
MODE1-4
IC303
SYNCHRONIZED SERIAL BUS TO PARALLEL
REC CUR
METER (L/R)
(See page 4-47)
SH-11
BOARD
(See page 4-15)
MF-251
BOARD (3/4)
LANC I/O
LANC
PHONES
IC861
IC862
METER (L)
METER (R)
SW BLOCK
FUNCTION SWITCH SHUTTLE SWITCH
COLOR SYS NTSC PB BACKLIGHT SWITCH
LED
IC301
LCD
LCD DRIVE
LCD CS
SI BUS, S CLK
BACKLIGHT
PL LED
B.L
PL-25
BOARD
(See page 4-28)
MF-250 BOARD
(See page 4-29)
A 12V
M 12V
SW 9V
A 5V
D 6V
DC 35V
A -8V
VPS, PDC POWER
POWR CONT
POWER SUPPLY BLOCK
AC IN
(See page 4-15)
MF-251
BOARD (4/4)
FUNCTION SWITCH
POWER EJECT
POWER LED
IC601
REMOTE CONTROL RECEVER
SIRCS
MA-181
BOARD (2/3)
(See page 4-15)
(See page 4-21)
PT-96 BOARD (3/3)
IC701
AUDIO MODE SELECT
IC703
INPUT SELECT
STD
IC101
TU (L)
TU (R)
(L)
(R)
LINE 2 AUDIO
VC, NP MODEL
IC706 (2/2)
CANAL PULS SWITCH
AU (L)
AU (R)
EURO AV
(See page 4-45)
CP-65
BOARD (4/4)
C+A (L)
C+A (R)
CANAL +
L1 AU (L)
L1 AU (R)
HIFI (L)
HIFI (R)
IO-50
BOARD (2/2)
(See page 4-35)

3-2. VIDEO BLOCK DIAGRAM-1



IC001 (50) REC PAL
20µsec/DIV
800mVp-p

IC001 (45) REC PAL
368mVp-p
H

IC001 (33) REC PAL
260mVp-p
H

IC001 (33) PB PAL
336mVp-p
H

IC001 (32) REC PAL
248 mVp-p
H

IC001 (32) PB PAL
332mVp-p
H

IC801 (23) PB PAL
100mV/DIV
20µsec/DIV

IC801 (27) PB PAL
200mV/DIV
20µsec/DIV

IC001 (43) PB PAL
100mV/DIV
20µsec/DIV

IC801 (25) PB PAL
200mV/DIV
20µsec/DIV

IC001 (47) REC PAL
10mV/DIV
20µsec/DIV

IC001 (28) REC PAL
2.04Vp-p
H

IC001 (28) PB PAL
2.16Vp-p
H

IC001 (16) REC PAL
688mVp-p
H

IC001 (16) PB PAL
592mVp-p
H

IC001 (18) REC PAL
92mVp-p
H

IC001 (14) REC PAL
664mVp-p
H

IC001 (14) PB PAL
584mVp-p
H

IC001 (20) REC PAL
696mV
H

IC001 (26) REC PAL
1.12Vp-p
H

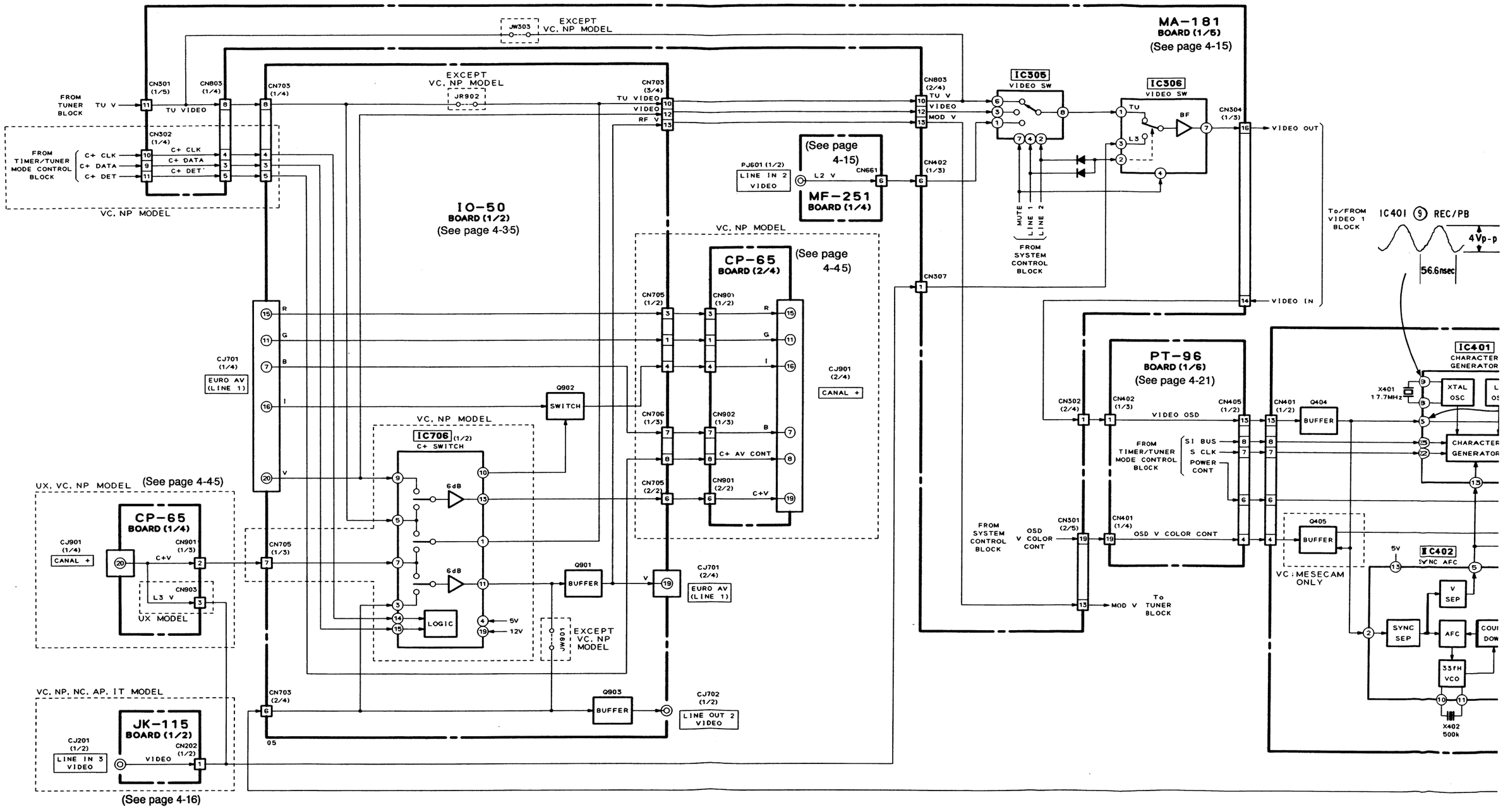
IC001 (51) PB PAL
84mVp-p
H

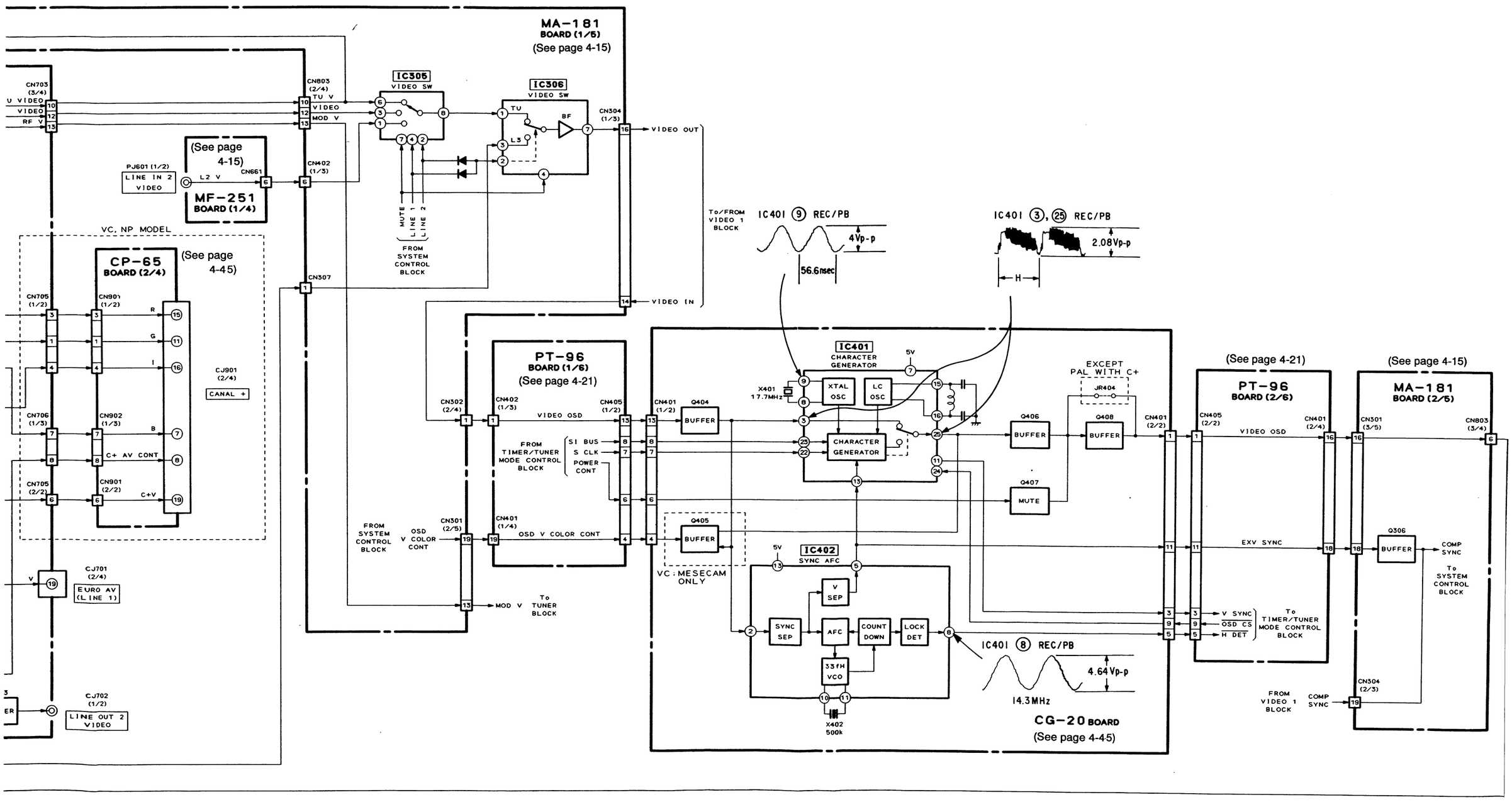
IC001 (53) REC PAL
312mVp-p
H

IC001 (6) REC/PB PAL
1.54Vp-p
4.43MHz

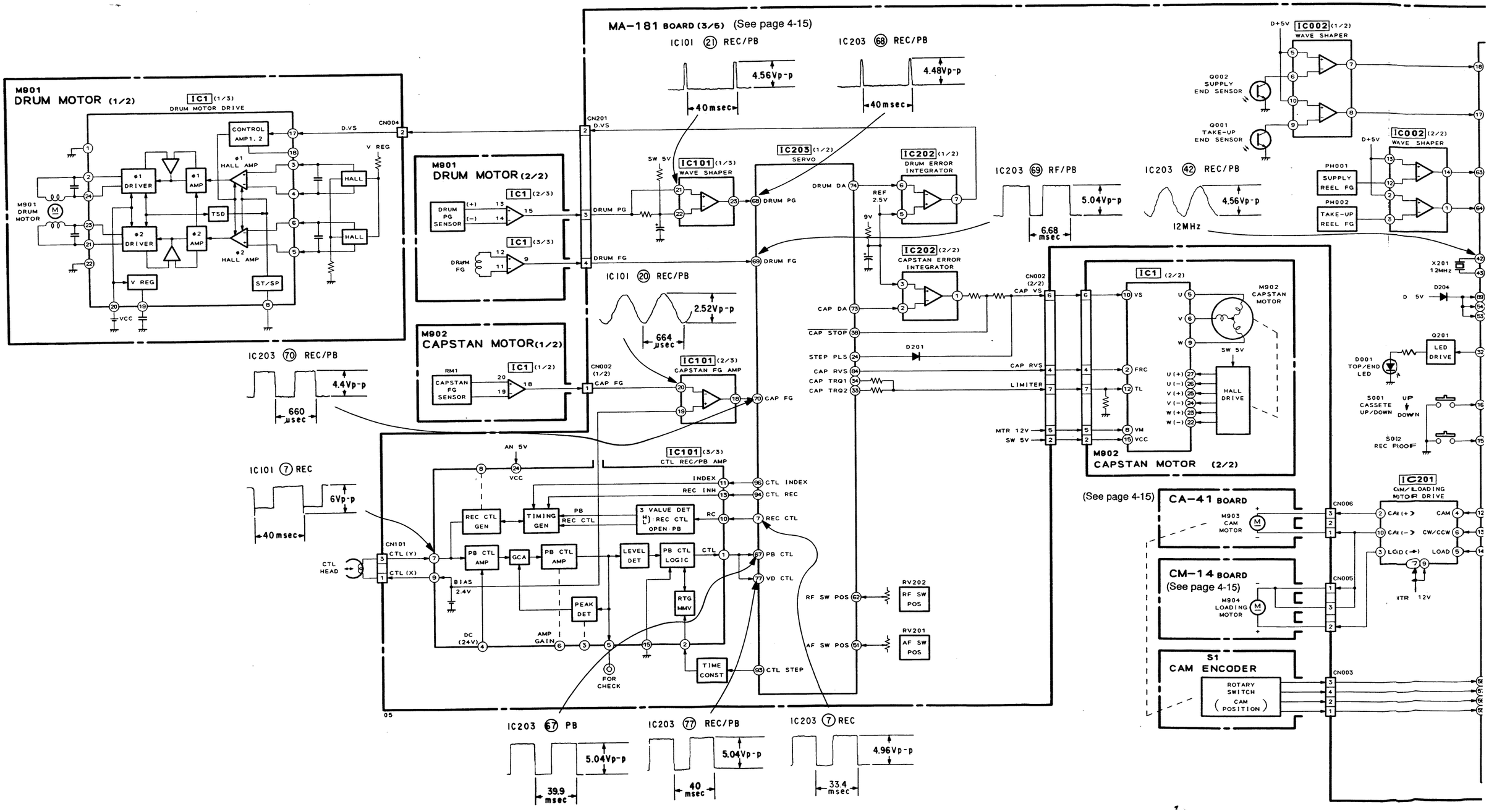
IC001 (7) REC/PB PAL
1Vp-p
4.43MHz

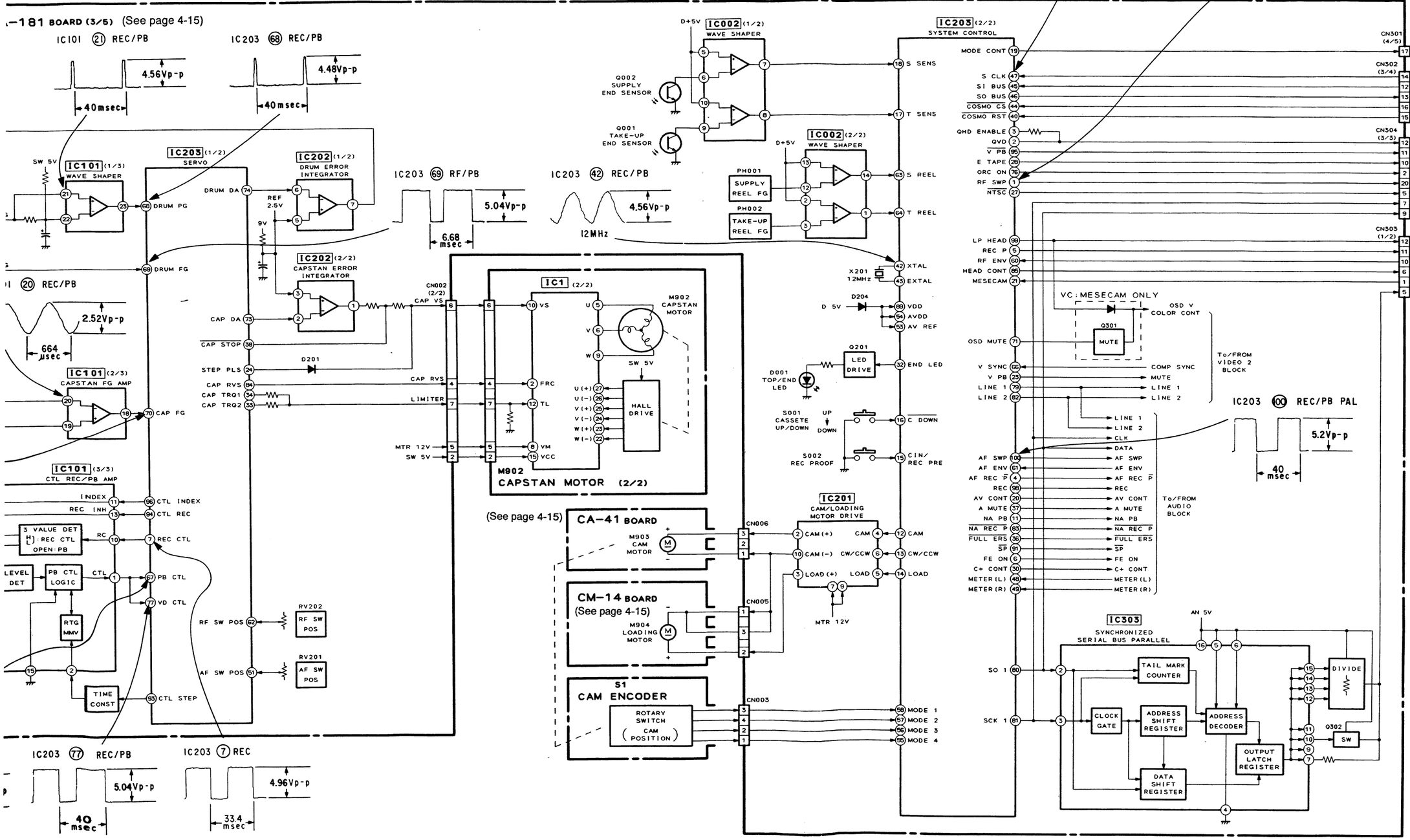
3-3. VIDEO BLOCK DIAGRAM-2



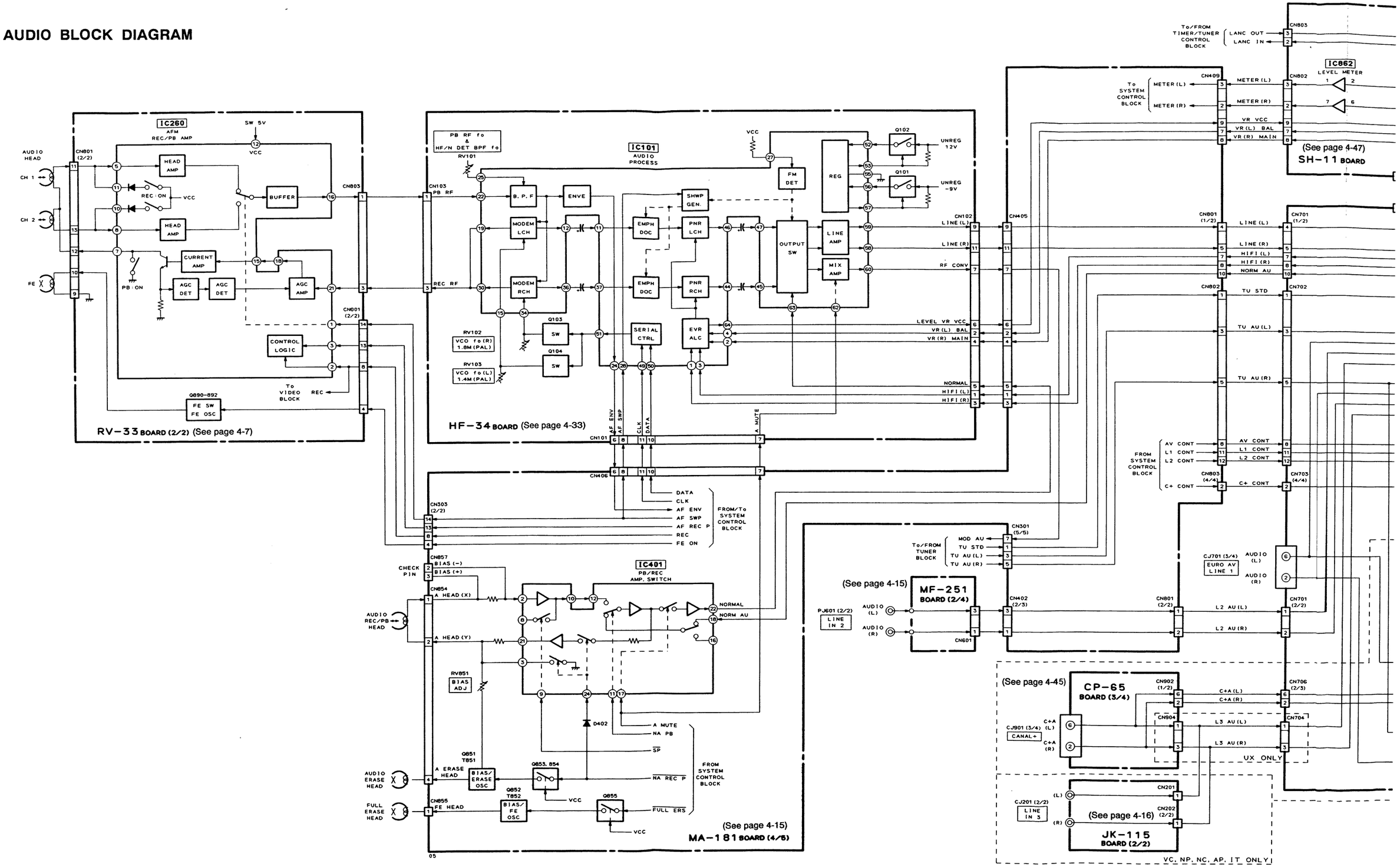

MA-181
BOARD (1/5)
(See page 4-15)
IC305
VIDEO SW
IC306
VIDEO SW
CN703 (3/4)
U VIDEO
VIDEO
RF V
CN803 (2/4)
TU V
VIDEO
MOD V
CN304 (1/5)
VIDEO OUT
VIDEO IN
TU
BF
L3
MUTE
LINE 1
LINE 2
FROM SYSTEM CONTROL BLOCK
PJ601 (1/2)
LINE IN 2 VIDEO
L2 V
CN661
(See page 4-15)
MF-251
BOARD (1/4)
CN402 (1/3)
CN307
VC, NP MODEL
CP-65
BOARD (2/4)
(See page 4-45)
CN705 (1/2)
CN901 (1/2)
R
G
I
CJ901 (2/4)
CANAL +
CN706 (1/3)
CN902 (1/3)
B
C+ AV CONT
CN705 (2/2)
CN901 (2/2)
C+V
CJ701 (2/4)
EURO AV (LINE 1)
CJ702 (1/2)
LINE OUT 2 VIDEO
To/FROM VIDEO 1 BLOCK
IC401 ⑨ REC/PB
4Vp-p
56.6nsec
IC401 ③, ㉕ REC/PB
2.08Vp-p
H
PT-96
BOARD (1/6)
(See page 4-21)
CN302 (2/4)
CN402 (1/3)
CN405 (1/2)
VIDEO OSD
FROM TIMER/TUNER MODE CONTROL BLOCK
SI BUS
S CLK
POWER CONT
FROM SYSTEM CONTROL BLOCK
OSD V COLOR CONT
CN301 (2/5)
CN401 (1/4)
OSD V COLOR CONT
MOD V
To TUNER BLOCK
CN401 (1/2)
Q404
BUFFER
Q405
BUFFER
VC: MESECAM ONLY
IC401
CHARACTER GENERATOR
5V
X401
17.7MHz
XTAL OSC
LC OSC
CHARACTER GENERATOR
IC402
SYNC AFC
V SEP
SYNC SEP
AFC
COUNT DOWN
LOCK DET
33fH VCO
X402
500k
IC401 ⑧ REC/PB
4.64Vp-p
14.3MHz
CG-20 BOARD
(See page 4-45)
Q406
BUFFER
Q407
MUTE
Q408
BUFFER
EXCEPT PAL WITH C+
JR404
CN401 (2/2)
(See page 4-21)
PT-96
BOARD (2/6)
CN405 (2/2)
VIDEO OSD
CN401 (2/4)
EXV SYNC
V SYNC
OSD CS
H DET
To TIMER/TUNER MODE CONTROL BLOCK
(See page 4-15)
MA-181
BOARD (2/5)
CN501 (3/5)
CN803 (3/4)
Q306
BUFFER
COMP SYNC
To SYSTEM CONTROL BLOCK
CN304 (2/3)
FROM VIDEO 1 BLOCK
COMP SYNC

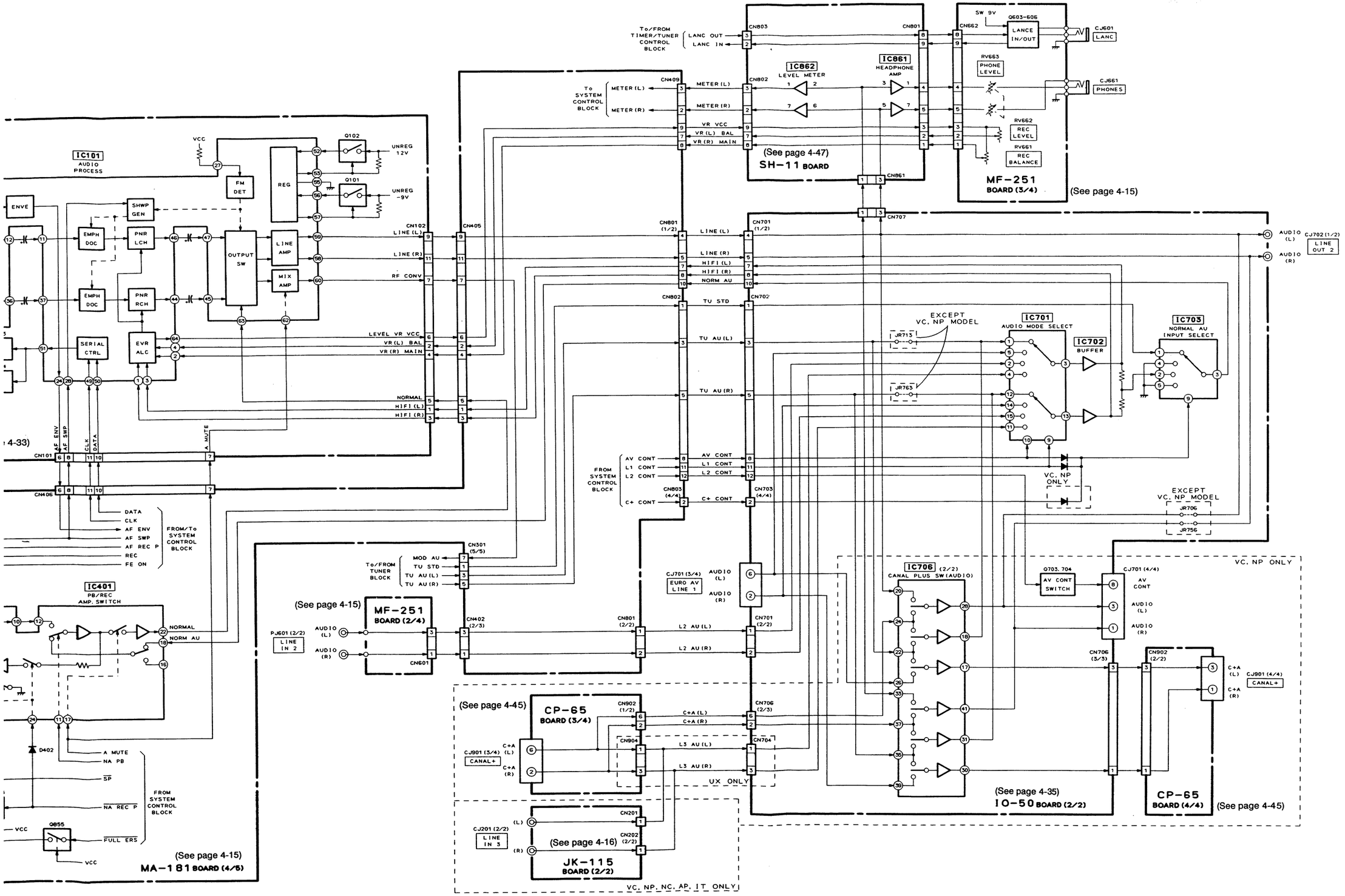
3-4. SERVO, SYSTEM CONTROL BLOCK DIAGRAM



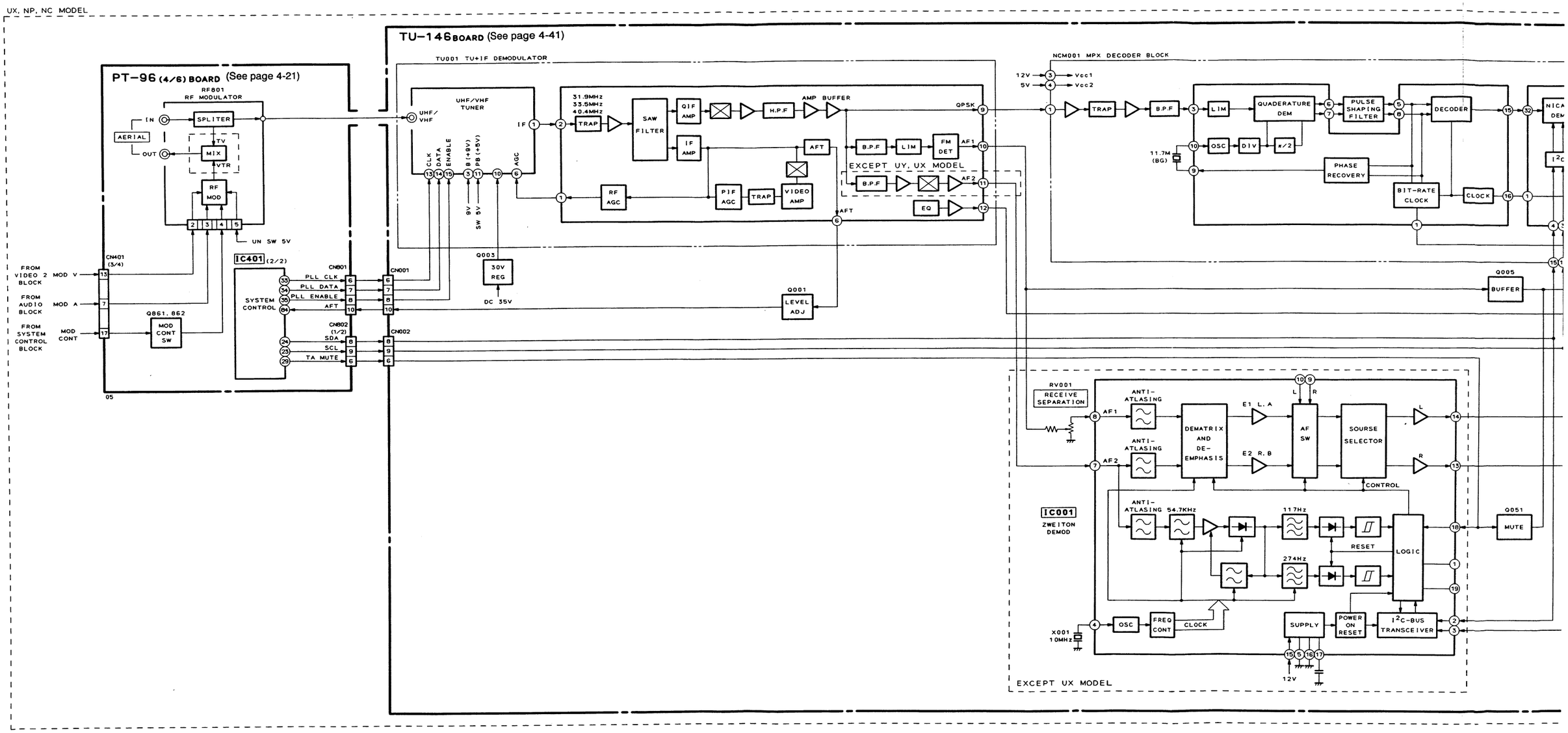

IC101 (21) REC/PB
4.56Vp-p
40msec
IC203 (68) REC/PB
4.48Vp-p
40msec
IC203 (47) REC/PB
10msec/DIV
5.04Vp-p
IC203 (1) REC/PB PAL
5.12Vp-p
40 msec
IC101 (1/3) WAVE SHAPER
IC203 (1/2) SERVO
IC202 (1/2) DRUM ERROR INTEGRATOR
SW 5V
DRUM DA
DRUM PG
DRUM FG
REF 2.5V
9V
IC203 (69) RF/PB
5.04Vp-p
6.68 msec
IC203 (42) REC/PB
4.56Vp-p
12MHz
IC202 (2/2) CAPSTAN ERROR INTEGRATOR
CAP DA
CAP STOP
STEP PLS
CAP RVS
CAP TRQ1
CAP TRQ2
D201
CN002 (2/2)
CAP VS
CAP RVS
LIMITER
MTR 12V
SW 5V
IC1 (2/2)
VS
FRC
TL
VM
VCC
M902 CAPSTAN MOTOR
U (+)
U (-)
V (+)
V (-)
W (+)
W (-)
HALL DRIVE
M902 CAPSTAN MOTOR (2/2)
IC203 (20) REC/PB
2.52Vp-p
664 µsec
IC101 (2/3) CAPSTAN FG AMP
CAP FG
IC101 (3/3) CTL REC/PB AMP
INDEX
REC INH
CTL INDEX
CTL REC
3 VALUE DET H: REC CTL L: OPEN: PB
RC
REC CTL
LEVEL DET
PB CTL LOGIC
CTL
PB CTL
VD CTL
RTG MMV
TIME CONST
CTL STEP
RF SW POS
AF SW POS
RV202
RF SW POS
RV201
AF SW POS
IC203 (77) REC/PB
5.04Vp-p
40 msec
IC203 (7) REC
4.96Vp-p
33.4 msec
D+5V
IC002 (1/2) WAVE SHAPER
Q002 SUPPLY END SENSOR
Q001 TAKE-UP END SENSOR
IC002 (2/2) WAVE SHAPER
PH001 SUPPLY REEL FG
PH002 TAKE-UP REEL FG
IC203 (2/2) SYSTEM CONTROL
S SENS
T SENS
S REEL
T REEL
XTAL
EXTAL
X201 12MHz
D 5V
D204
VDD
AVDD
AV REF
Q201 LED DRIVE
D001 TOP/END LED
END LED
S001 CASSETE UP/DOWN
UP
DOWN
C DOWN
S002 REC PROOF
CIN/ REC PRE
IC201 CAM/LOADING MOTOR DRIVE
CA-41 BOARD
M903 CAM MOTOR
CN006
CAM (+)
CAM (-)
LOAD (+)
CAM
CW/CCW
LOAD
MTR 12V
CM-14 BOARD
(See page 4-15)
M904 LOADING MOTOR
CN005
S1 CAM ENCODER
ROTARY SWITCH (CAM POSITION)
CN003
MODE 1
MODE 2
MODE 3
MODE 4
(See page 4-15)
MODE CONT
S CLK
SI BUS
SO BUS
COSMO CS
COSMO RST
QHD ENABLE
QVD
V PB
E TAPE
ORC ON
RF SWP
NTSC
LP HEAD
REC P
RF ENV
HEAD CONT
MESECAM
VC: MESECAM ONLY
OSD V COLOR CONT
Q301 MUTE
OSD MUTE
V SYNC
V PB
LINE 1
LINE 2
COMP SYNC
MUTE
LINE 1
LINE 2
To/FROM VIDEO 2 BLOCK
IC203 (100) REC/PB PAL
5.2Vp-p
40 msec
CLK
DATA
AF SWP
AF ENV
AF REC P
REC
AV CONT
A MUTE
NA PB
NA REC P
FULL ERS
SP
FE ON
C+ CONT
METER (L)
METER (R)
To/FROM AUDIO BLOCK
CN301 (4/5)
CN302 (3/4)
CN304 (3/3)
CN303 (1/2)
To TUNER BLOCK
To/FROM TIMER/TUNER MODE CONTROL BLOCK
To/FROM VIDEO 1 BLOCK
IC303 SYNCHRONIZED SERIAL BUS PARALLEL
AN 5V
SO 1
SCK 1
TAIL MARK COUNTER
CLOCK GATE
ADDRESS SHIFT REGISTER
ADDRESS DECODER
DATA SHIFT REGISTER
OUTPUT LATCH REGISTER
DIVIDE
Q302 SW

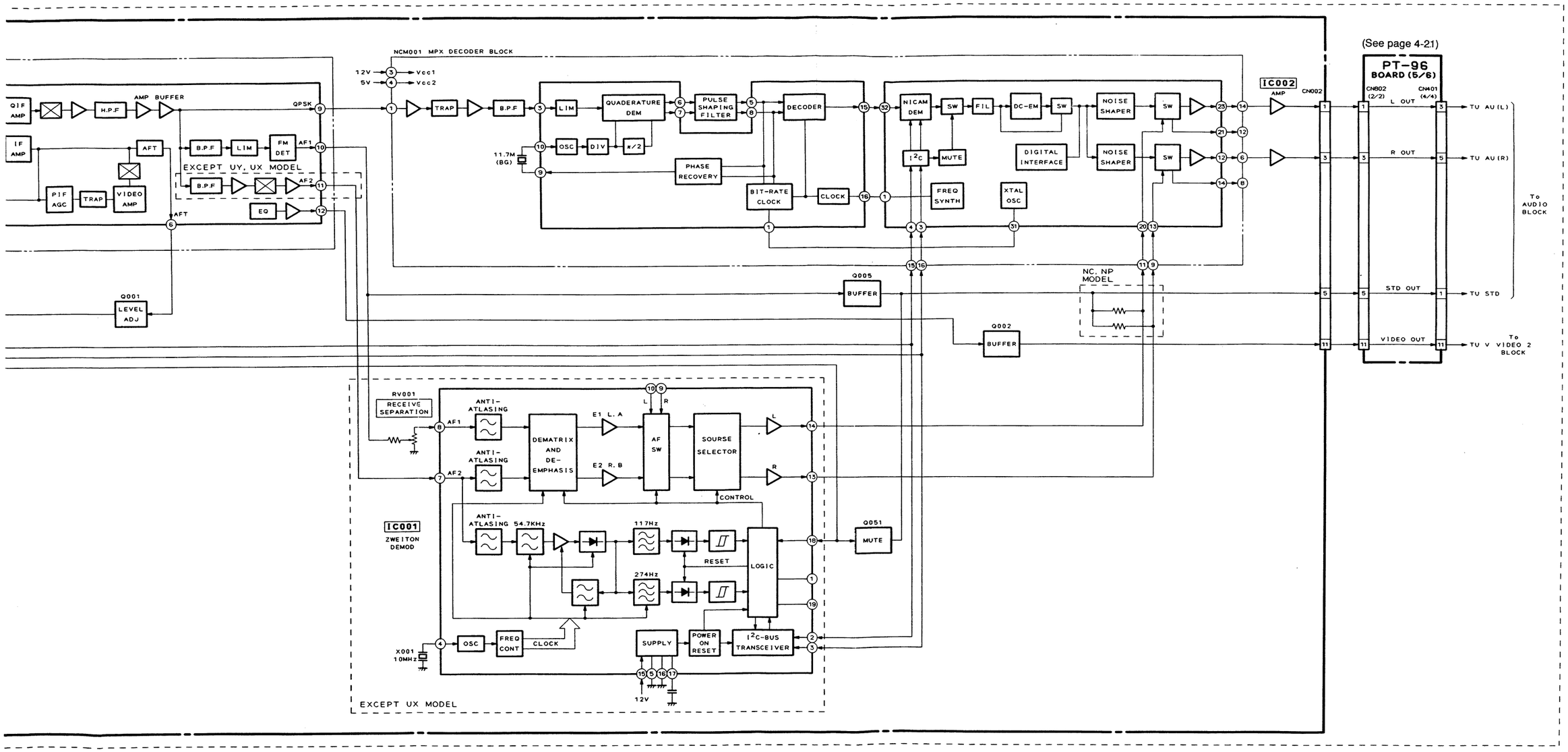
3-5. AUDIO BLOCK DIAGRAM



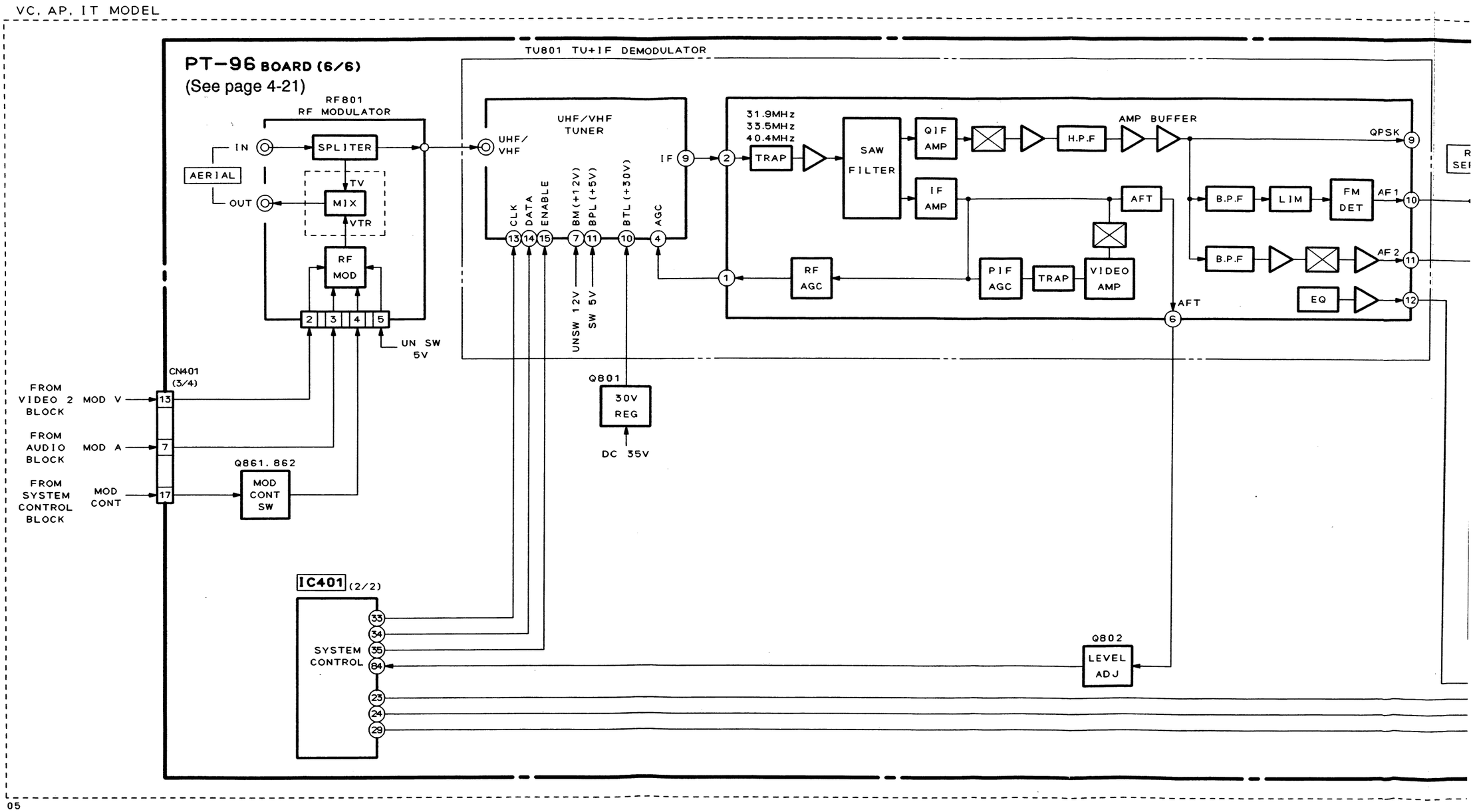

IC101
AUDIO PROCESS
VCC
FM DET
REG
Q102
UNREG 12V
Q101
UNREG -9V
ENVE
SHWP GEN
EMPH DOC
PNR LCH
PNR RCH
OUTPUT SW
LINE AMP
MIX AMP
SERIAL CTRL
EVR ALC
CN102
LINE (L)
LINE (R)
RF CONV
LEVEL VR VCC
VR (L) BAL
VR (R) MAIN
NORMAL
HIFI (L)
HIFI (R)
CN405
AF ENV
AF SWP
CLK
DATA
A MUTE
CN101
CN406
DATA
CLK
AF ENV
AF SWP
AF REC P
REC
FE ON
FROM/To SYSTEM CONTROL BLOCK
IC401
PB/REC AMP. SWITCH
NORMAL
NORM AU
D402
A MUTE
NA PB
SP
NA REC P
FULL ERS
Q855
VCC
(See page 4-15)
MA-181 BOARD (4/5)
To/FROM TIMER/TUNER CONTROL BLOCK
LANC OUT
LANC IN
CN803
CN801
IC862
LEVEL METER
IC861
HEADPHONE AMP
To SYSTEM CONTROL BLOCK
METER (L)
METER (R)
CN409
CN802
VR VCC
VR (L) BAL
VR (R) MAIN
(See page 4-47)
SH-11 BOARD
CN861
SW 9V
Q603-606
LANCE IN/OUT
CN662
CJ601
LANC
RV663
PHONE LEVEL
CJ661
PHONES
RV662
REC LEVEL
RV661
REC BALANCE
MF-251
BOARD (3/4)
(See page 4-15)
CN707
CN801 (1/2)
CN701 (1/2)
LINE (L)
LINE (R)
HIFI (L)
HIFI (R)
NORM AU
AUDIO (L)
AUDIO (R)
CJ702 (1/2)
LINE OUT 2
CN802
CN702
TU STD
TU AU (L)
TU AU (R)
EXCEPT VC. NP MODEL
JR713
JR765
IC701
AUDIO MODE SELECT
IC702
BUFFER
IC703
NORMAL AU INPUT SELECT
VC. NP ONLY
EXCEPT VC. NP MODEL
JR706
JR756
FROM SYSTEM CONTROL BLOCK
AV CONT
L1 CONT
L2 CONT
C+ CONT
CN803 (4/4)
CN703 (4/4)
CN301 (5/5)
To/FROM TUNER BLOCK
MOD AU
TU STD
TU AU (L)
TU AU (R)
(See page 4-15)
MF-251
BOARD (2/4)
PJ601 (2/2)
LINE IN 2
AUDIO (L)
AUDIO (R)
CN402 (2/3)
CN601
CN801 (2/2)
CN701 (2/2)
L2 AU (L)
L2 AU (R)
CJ701 (3/4)
EURO AV LINE 1
IC706 (2/2)
CANAL PLUS SW(AUDIO)
Q703, 704
AV CONT SWITCH
CJ701 (4/4)
CN706 (3/3)
CN902 (2/2)
C+A (L)
C+A (R)
CJ901 (4/4)
CANAL+
VC. NP ONLY
(See page 4-45)
CP-65
BOARD (3/4)
CN902 (1/2)
CN706 (2/3)
CN904
CN704
L3 AU (L)
L3 AU (R)
UX ONLY
(See page 4-35)
IO-50 BOARD (2/2)
CP-65
BOARD (4/4)
(See page 4-45)
CJ201 (2/2)
LINE IN 3
CN201
CN202 (2/2)
(See page 4-16)
JK-115
BOARD (2/2)
VC. NP. NC. AP. IT ONLY

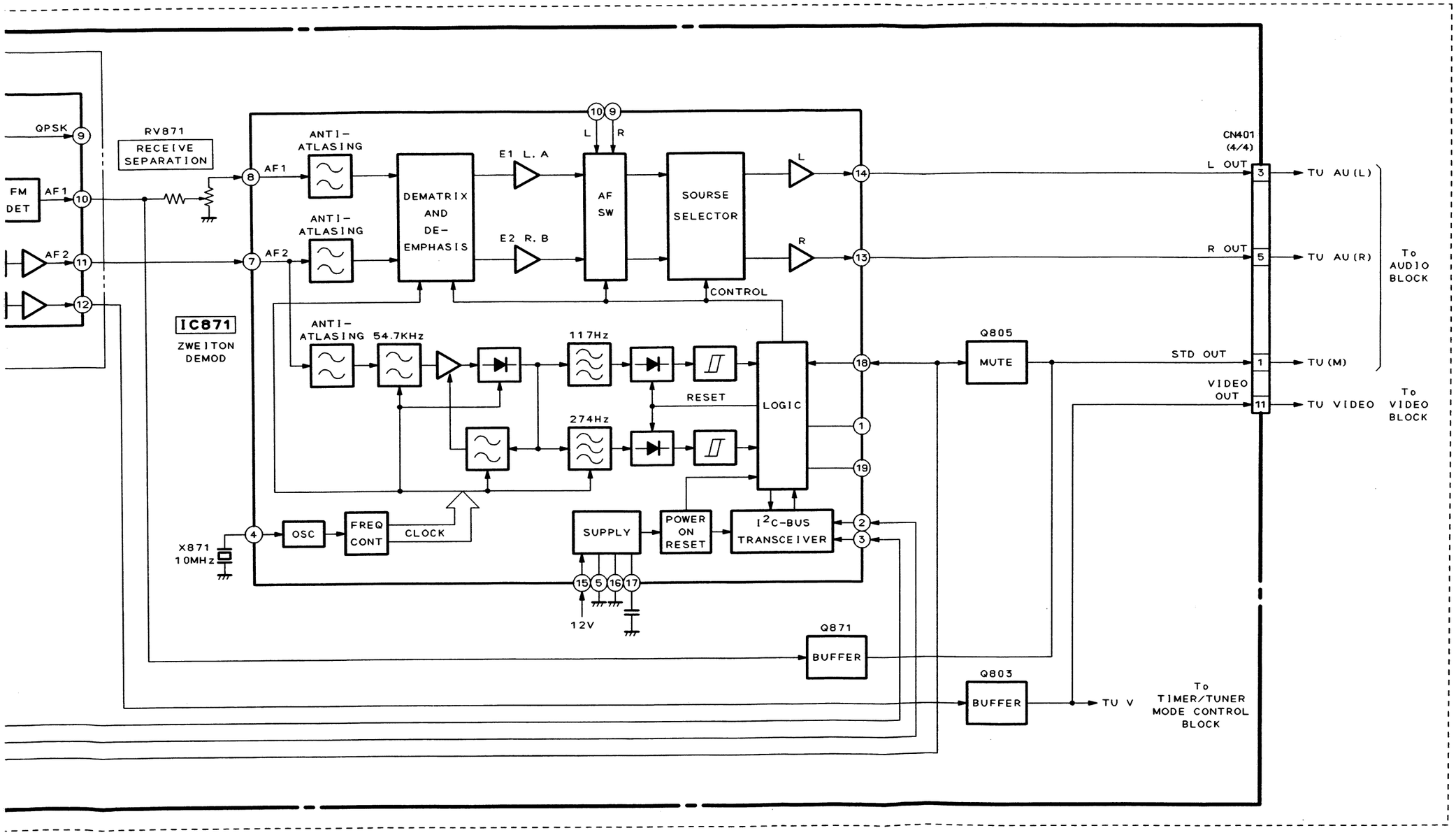
3-6. TUNER BLOCK DIAGRAM-1



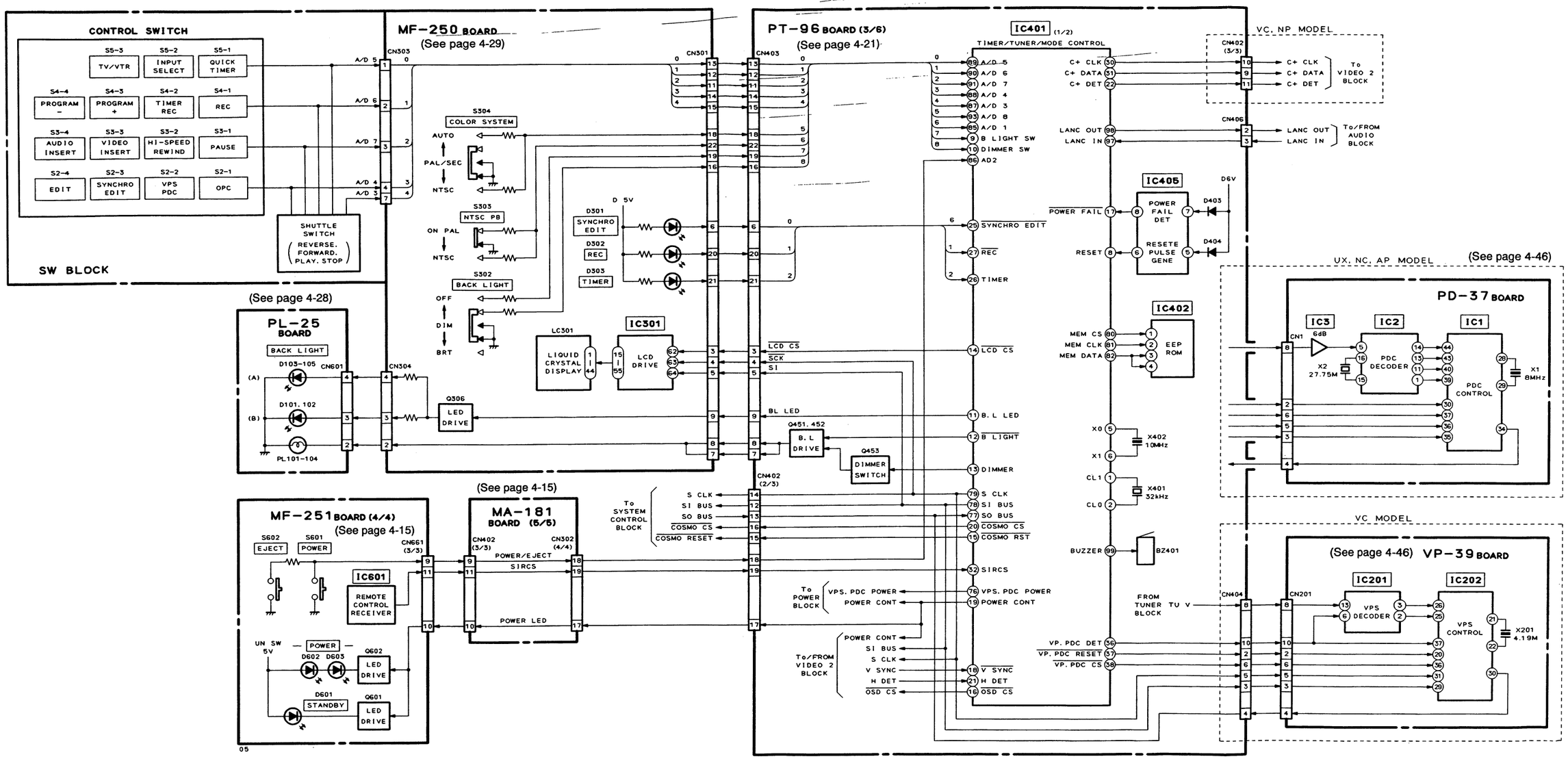

(See page 4-21)
NCM001 MPX DECODER BLOCK
12V
5V
Vcc1
Vcc2
QIF AMP
H.P.F
AMP BUFFER
QPSK
IF AMP
AFT
B.P.F
LIM
FM DET
AF1
EXCEPT UY, UX MODEL
AF2
PIF AGC
TRAP
VIDEO AMP
EQ
AFT
Q001
LEVEL ADJ
TRAP
B.P.F
LIM
QUADERATURE DEM
PULSE SHAPING FILTER
DECODER
11.7M (BG)
OSC
DIV
π/2
PHASE RECOVERY
BIT-RATE CLOCK
CLOCK
NICAM DEM
SW
FIL
DC-EM
SW
NOISE SHAPER
SW
I²C
MUTE
DIGITAL INTERFACE
NOISE SHAPER
SW
FREQ SYNTH
XTAL OSC
IC002
AMP
CN002
PT-96
BOARD (5/6)
CN802 (2/2)
CN401 (4/4)
L OUT
R OUT
STD OUT
VIDEO OUT
TU AU (L)
TU AU (R)
TU STD
To AUDIO BLOCK
To TU V VIDEO 2 BLOCK
Q005
BUFFER
Q002
BUFFER
NC, NP MODEL
RV001
RECEIVE SEPARATION
AF1
AF2
ANTI-ATLASING
ANTI-ATLASING
DEMATRIX AND DE-EMPHASIS
E1 L, A
E2 R, B
L
R
AF SW
SOURSE SELECTOR
L
R
CONTROL
IC001
ZWEITON DEMOD
ANTI-ATLASING
54.7KHz
117Hz
274Hz
RESET
LOGIC
Q051
MUTE
X001
10MHz
OSC
FREQ CONT
CLOCK
SUPPLY
POWER ON RESET
I²C-BUS TRANSCEIVER
12V
EXCEPT UX MODEL

3-7. TUNER BLOCK DIAGRAM-2

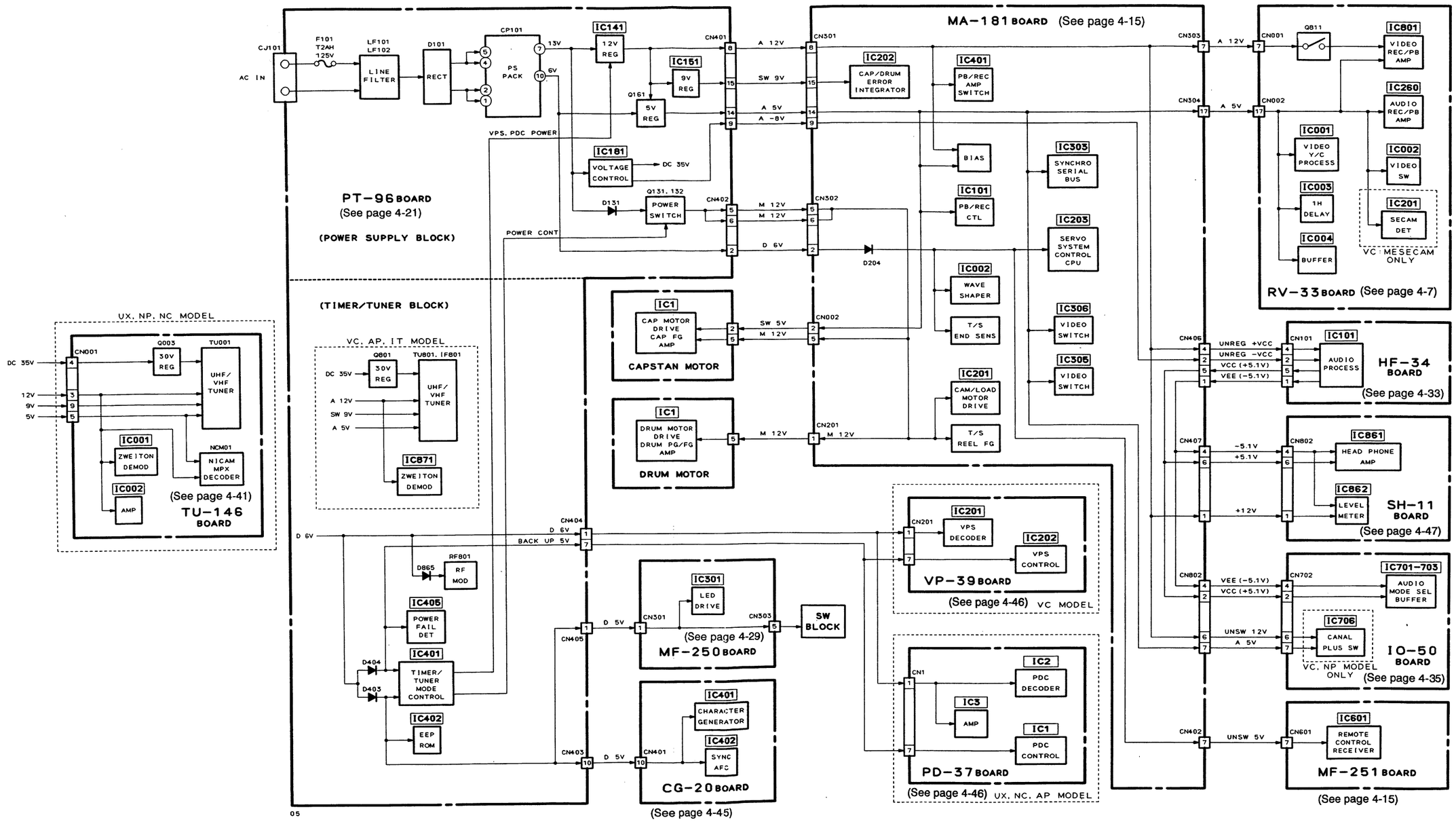



QPSK
9
FM DET
AF1
10
AF2
11
12
RV871
RECEIVE SEPARATION
8
AF1
ANTI-ATLASING
7
AF2
ANTI-ATLASING
DEMATRIX AND DE-EMPHASIS
E1 L. A
E2 R. B
10
9
L
R
AF SW
SOURSE SELECTOR
L
R
CONTROL
14
13
CN401 (4/4)
L OUT
3
TU AU (L)
R OUT
5
TU AU (R)
To AUDIO BLOCK
IC871
ZWEITON DEMOD
ANTI-ATLASING
54.7KHz
117Hz
274Hz
RESET
LOGIC
18
1
19
Q805
MUTE
STD OUT
1
TU (M)
VIDEO OUT
11
TU VIDEO
To VIDEO BLOCK
X871
10MHz
4
OSC
FREQ CONT
CLOCK
SUPPLY
POWER ON RESET
I2C-BUS TRANSCEIVER
2
3
15
5
16
17
12V
Q871
BUFFER
Q803
BUFFER
TU V
To TIMER/TUNER MODE CONTROL BLOCK

3-8. TIMER, MODE CONTROL BLOCK DIAGRAM



3-9. POWER SUPPLY BLOCK DIAGRAM



SECTION 4
PRINTED WIRING BOARDS AND SCHEMATIC DIAGRAMS

THIS NOTE IS COMMON FOR PRINTED WIRING BOARDS AND SCHEMATIC DIAGRAMS.
(In addition to this, the necessary note is printed in each block.)

For printed wiring boards:

- o——— : indicates a lead wire mounted on the component side.
- •——— : indicates a lead wire mounted on the printed side.
- ○ : Through hole.
- ■ : Parts mounted on the conductor side.
- ▒▒▒ : Pattern from the side which enables seeing.
- ▒▒▒ : Pattern of the rear side.*
- Circled numbers refer to waveforms.

Caution:	
Pattern face side: (Conductor Side)	Parts on the pattern face side seen from the pattern face are indicated.
Parts face side: (Component Side)	Parts on the parts face side seen from the parts face are indicated.

For schematic diagram:

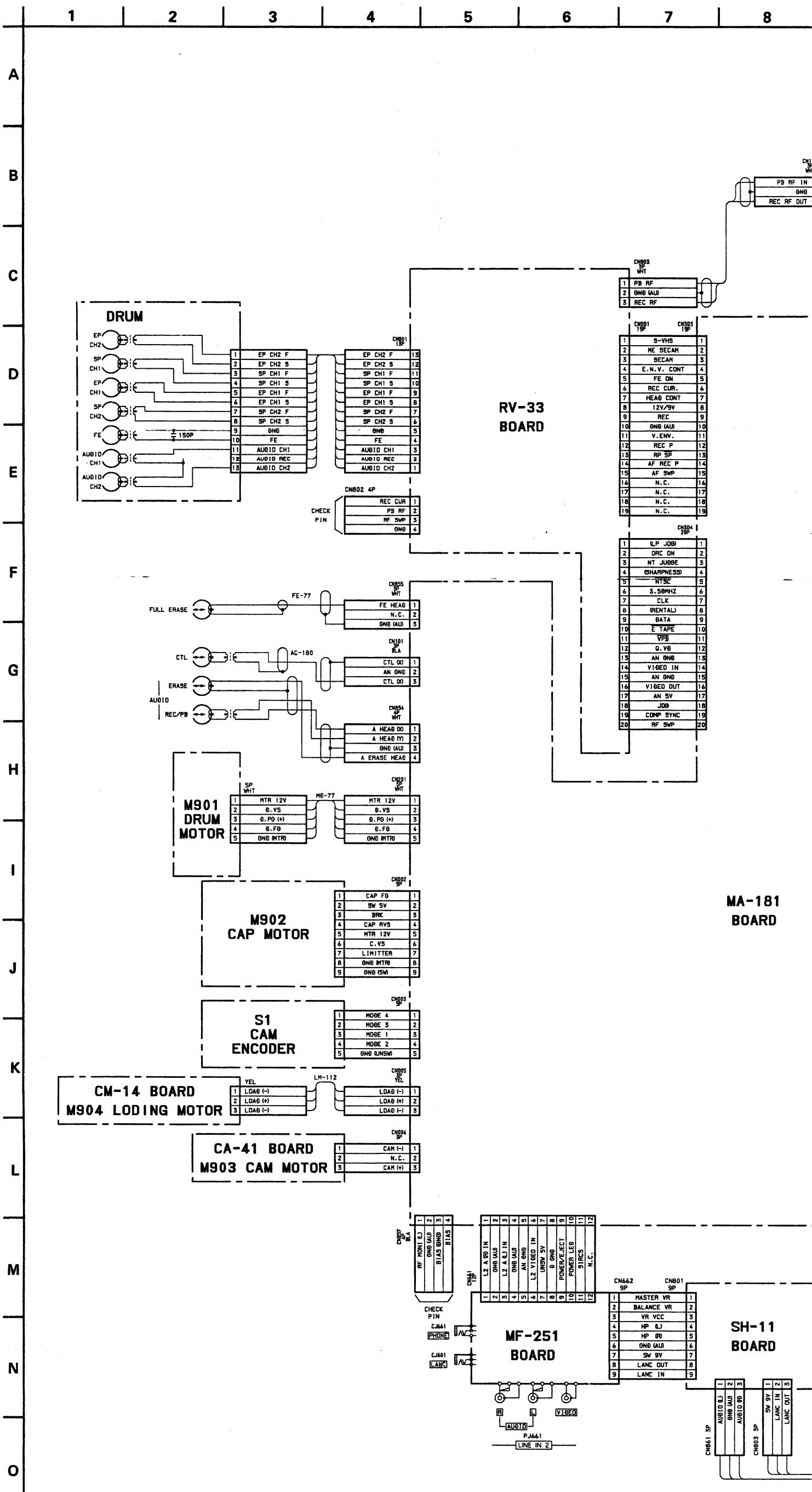
- Caution when replacing chip parts.
  New parts must be attached after removal of chip.
  Be careful not to heat the minus side of tantalum capacitor, because it is damaged by the heat.
- All resistors are in ohms, 1/4W (Chip resistors: 1/10W) unless otherwise noted.
  kΩ: 1000Ω, MΩ: 1000kΩ.
- All capacitors are in μF unless otherwise noted. pF: μμF 50V or less are not indicated except for electrolytics and tantalums.
- All variable and adjustable resistors have characteristic curve B, unless otherwise noted.
- ⊣▭⊢ : nonflammable resistor.
- ⊣▭⊢ : fusible resistor.
- ▭ : panel designation.
- △ : internal component.
- ▭ : adjustment for repair.*
- ▬▬ : B + Line.*
- ▬ ▬ ▬ : B − Line.*
- ⇨ : IN/OUT direction of B line (+ , −).*
- Circled numbers refer to waveforms.*
- Voltages are dc between measurement point.*
- Readings are taken with a color-bar signal input.*
- Readings are taken with a digital multimeter (DC10MΩ).*
- Voltage are taken with a VOM (Input impedance 10MΩ).*
- Voltage variations may be noted due to normal production tolerances.*

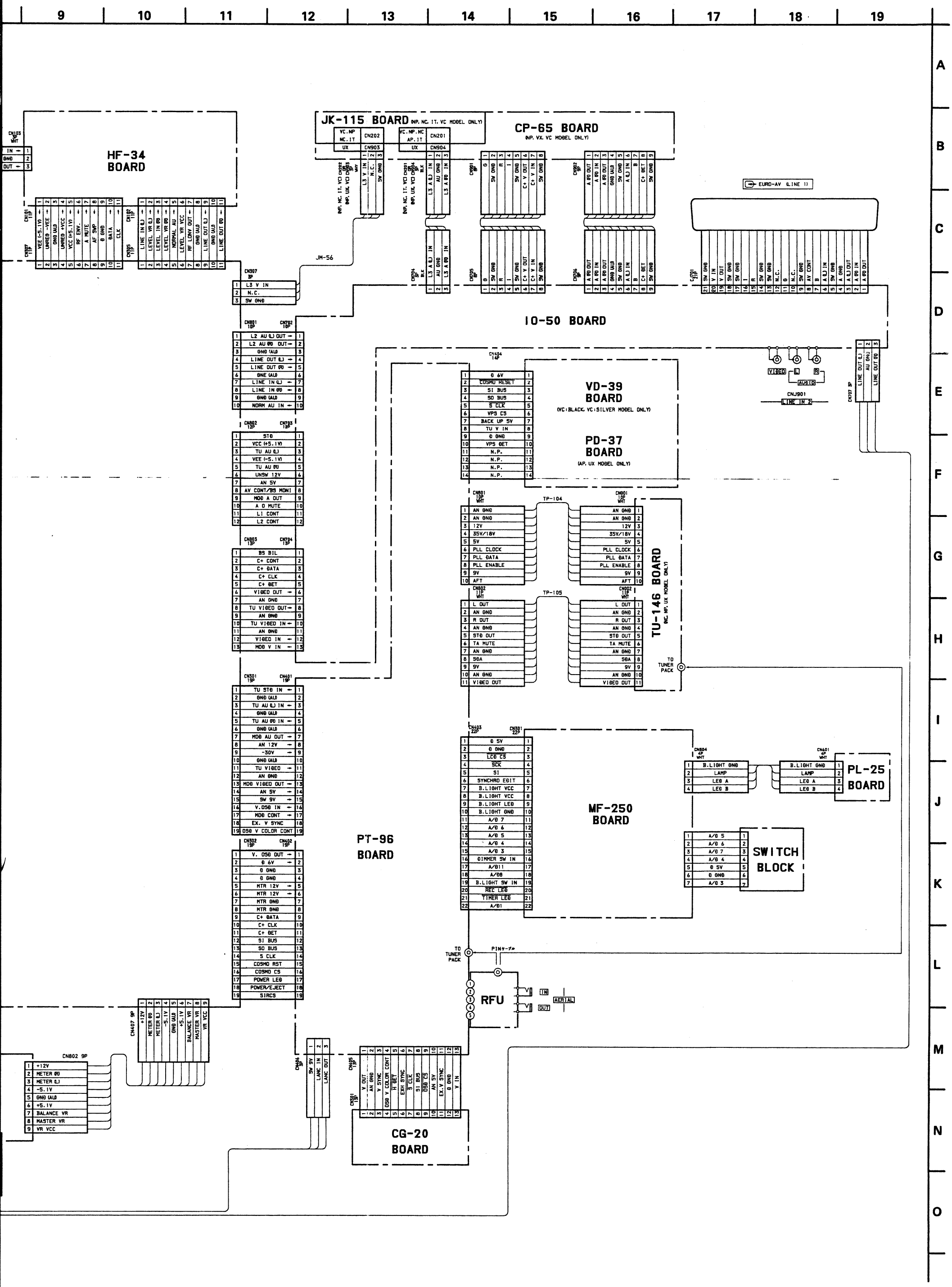
Note: The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety.
Replace only with part number specified.

When indicating parts by reference number, please include the board name.

- * : indicated by the color red.

4-1. FRAME SCHEMATIC DIAGRAM




9
10
11
12
13
14
15
16
17
18
19
A
B
C
D
E
F
G
H
I
J
K
L
M
N
O
HF-34 BOARD
JK-115 BOARD (NP, NC, IT, VC MODEL ONLY)
CP-65 BOARD (NP, VX, VC MODEL ONLY)
EURO-AV (LINE 1)
JM-56
IO-50 BOARD
VD-39 BOARD (VC:BLACK, VC:SILVER MODEL ONLY)
PD-37 BOARD (AP, UX MODEL ONLY)
VIDEO
AUDIO
CNJ901 LINE IN 2
TU-146 BOARD (INC. NP, UX MODEL ONLY)
TP-104
TP-105
TO TUNER PACK
PT-96 BOARD
MF-250 BOARD
SWITCH BLOCK
PL-25 BOARD
RFU
IN
OUT
AERIAL
CG-20 BOARD

FRAME

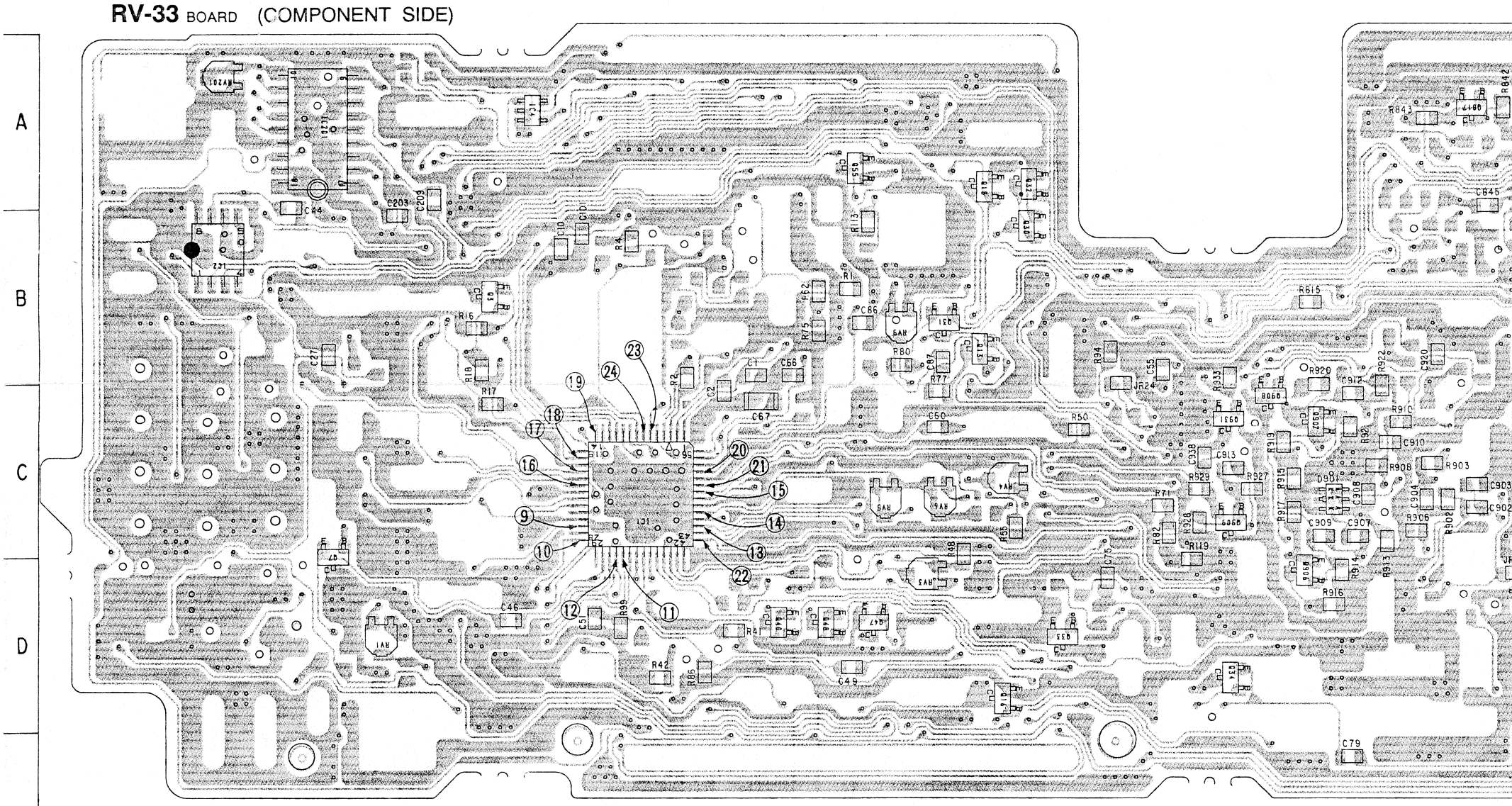
4-2. PRINTED WIRING BOARDS AND SCHEMATIC DIAGRAMS

RV-33 (HEAD AMP, VIDEO) PRINTED WIRING BOARD

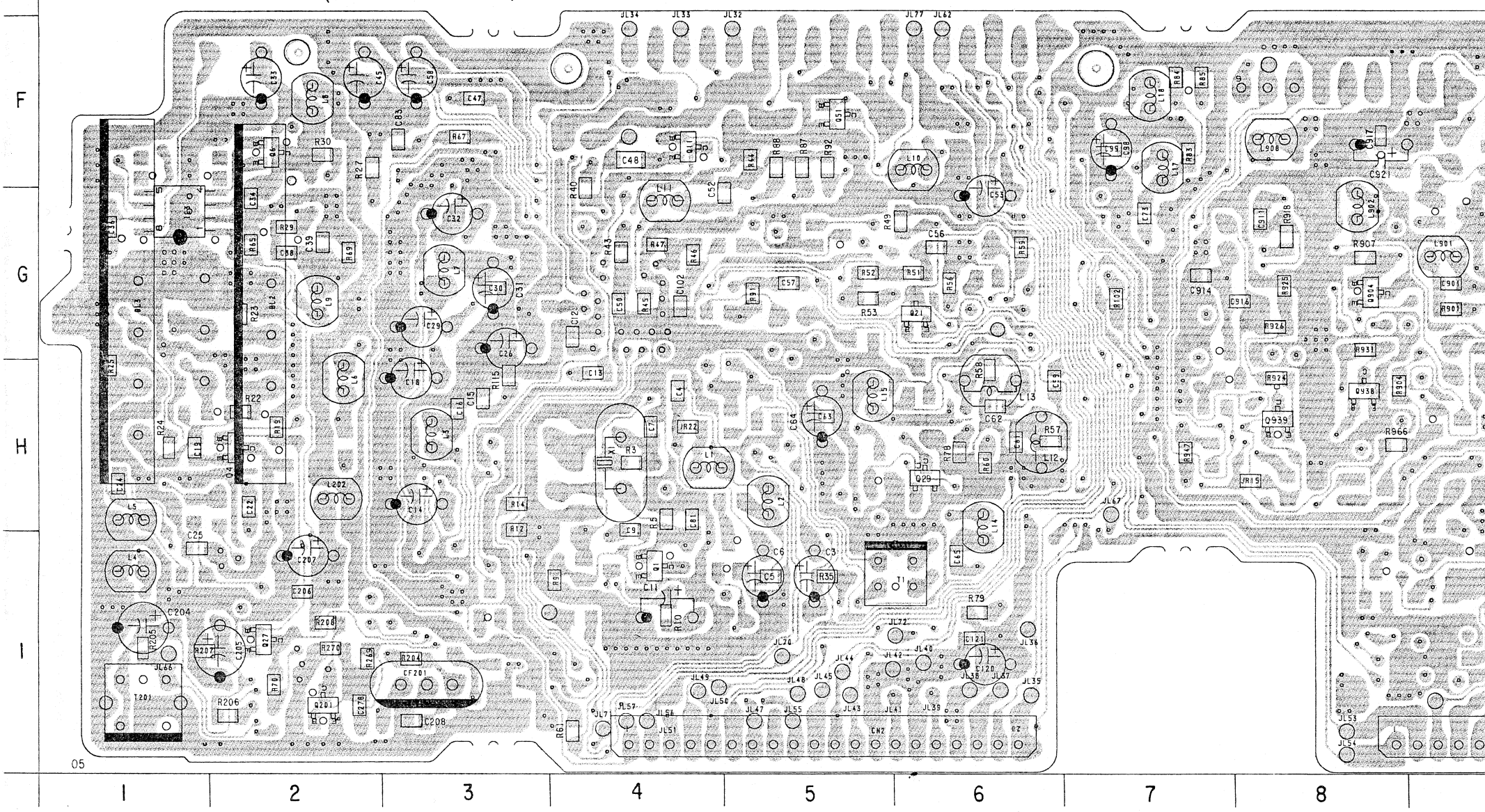
– Ref. No.: RV-33 Board; 1,000 series –

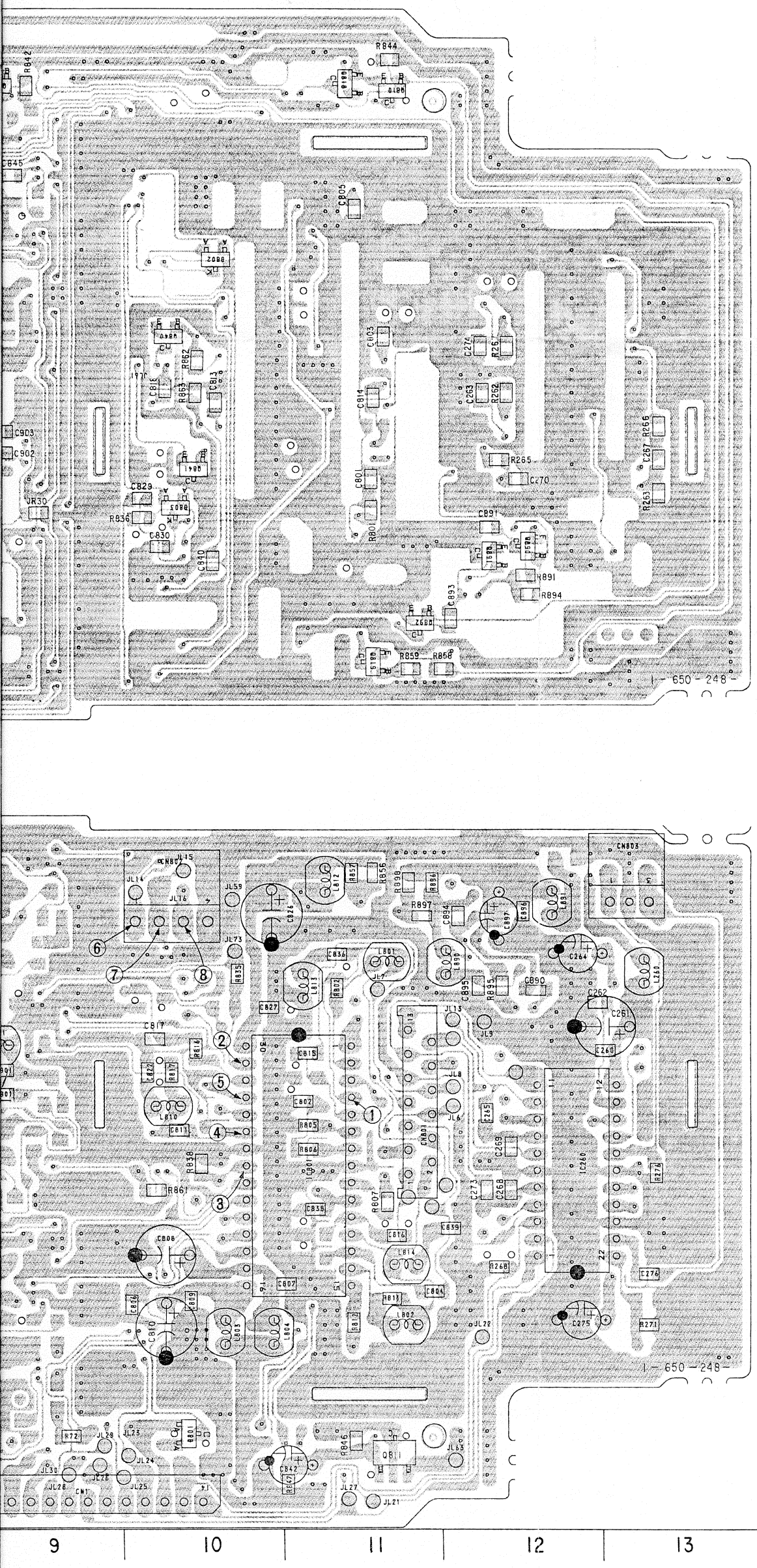
- There is no indication for destination in the printed wiring board diagram.

RV-33 BOARD (COMPONENT SIDE)



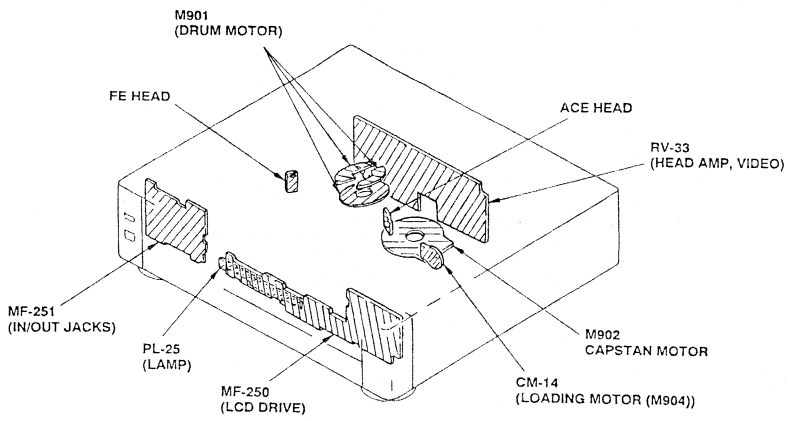
RV-33 BOARD (CONDUCTOR SIDE)





RV-33 BOARD

CN001	I-9
CN002	I-5
CN801	G-11
CN802	F-10
CN803	F-13
D801	I-10
D802	B-10
D803	D-10
D901	C-8
IC001	C-4
IC002	B-2
IC003	G-1
IC004	A-3
IC201	A-2
IC260	G-12
IC801	H-11
Q001	I-4
Q003	B-3
Q004	H-2
Q006	F-2
Q007	C-2
Q011	F-4
Q013	B-6
Q016	D-6
Q018	B-6
Q021	G-6
Q029	H-6
Q030	B-6
Q031	B-6
Q032	A-6
Q033	D-6
Q034	D-7
Q040	D-5
Q047	D-5
Q048	D-5
Q051	F-5
Q055	A-5
Q201	I-2
Q810	A-11
Q811	I-11
Q817	A-9
Q818	A-11
Q819	D-11
Q840	B-10
Q841	C-10
Q890	D-12
Q891	D-12
Q892	D-11
Q904	G-8
Q906	D-8
Q907	C-8
Q908	C-8
Q909	C-7
Q931	C-7
Q938	H-8
Q939	H-8



RV-33 (HEAD AMP, VIDEO) SCHEMATIC DIAGRAM

– Ref. No.: RV-33 Board; 1,000 series –

1 2 3 4 5 6 7 8 9 10 11 12

A B C D E F G H I J K L M N O

• Signal path

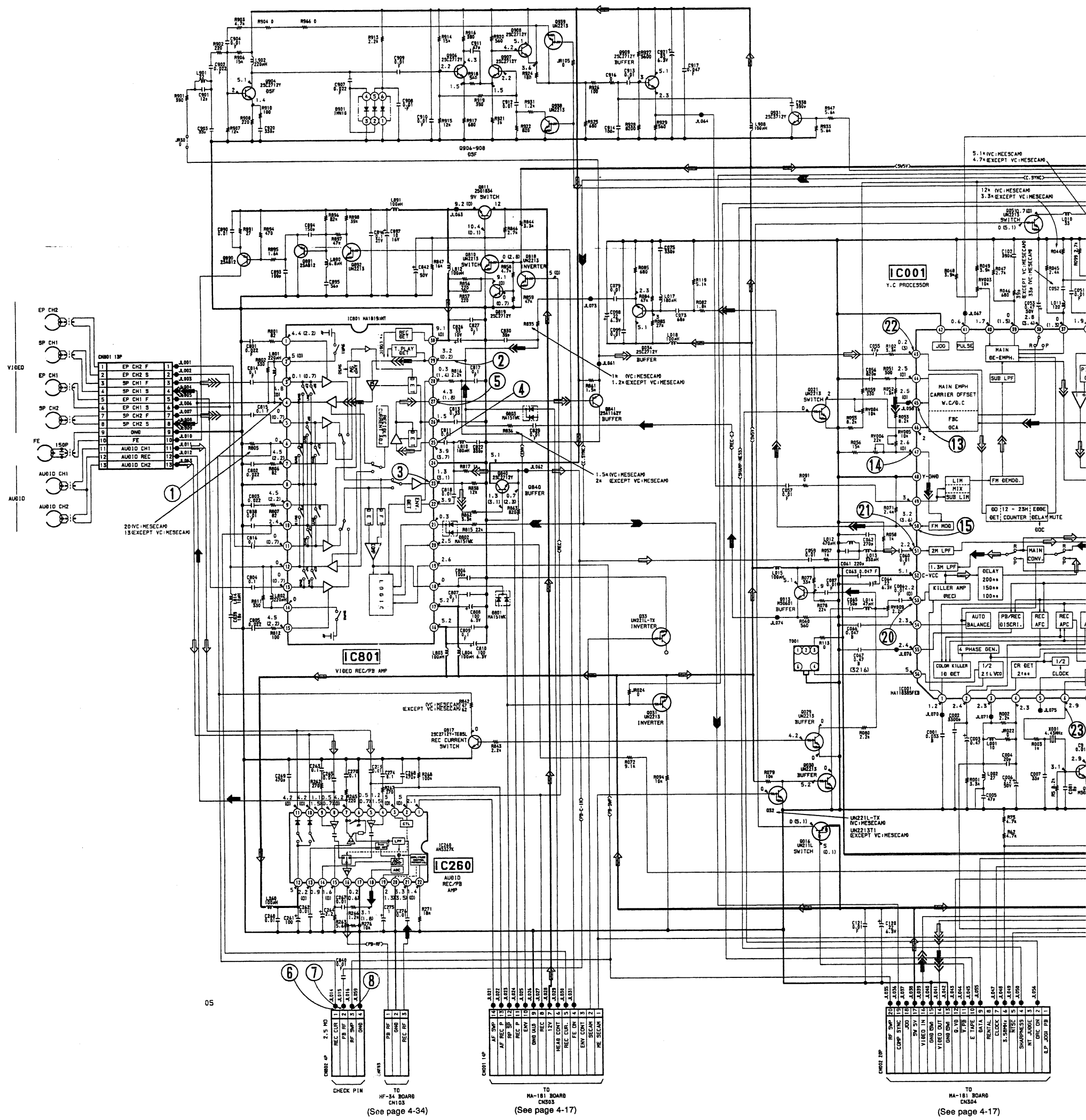
	VIDEO SIGNAL			AUDIO SIGNAL
	CHROMA	Y	Y/CHROMA	
REC	➡	➡»	➡»»	➡
PB	⇨	⇨»	⇨»»	⇨

• Signal path

	REC	REC/PB	PB
Drum speed servo		▷	
Drum phase servo		▷»	
Drum servo (speed and phase)		▷»»	
Capstan speed servo		▷	
Capstan phase servo	▶»	▷»	▷»
Capstan servo (speed and phase)		▷»»	
Ref. signal	▶		▷

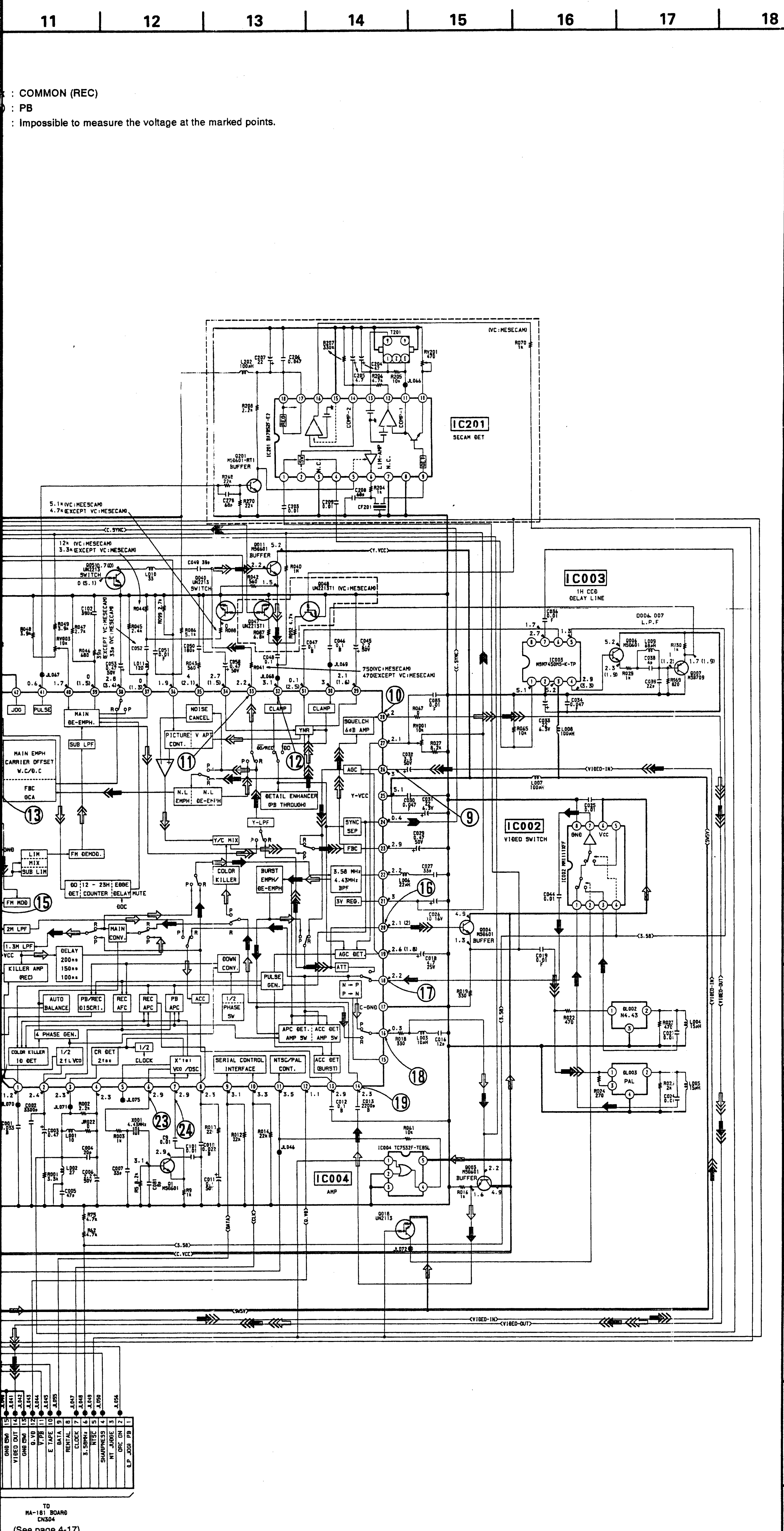
No mark : COMMON (REC)
( ) : PB
* : Impossible to measure the voltag

RV-33 BOARD

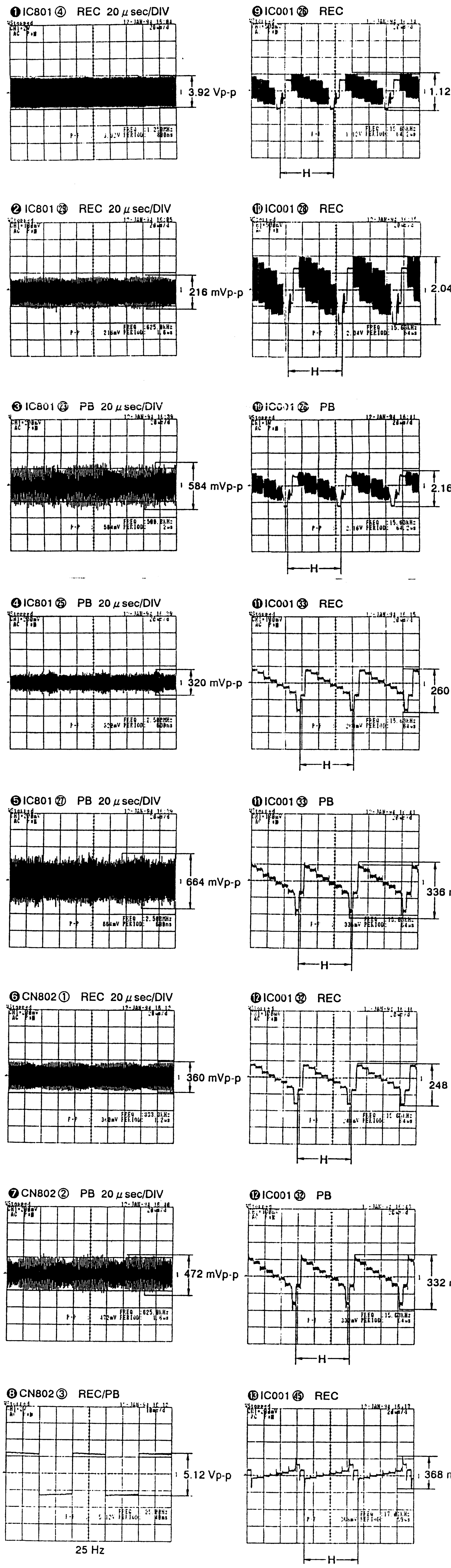


RV-33 BOARD

: COMMON (REC)
: PB
: Impossible to measure the voltage at the marked points.

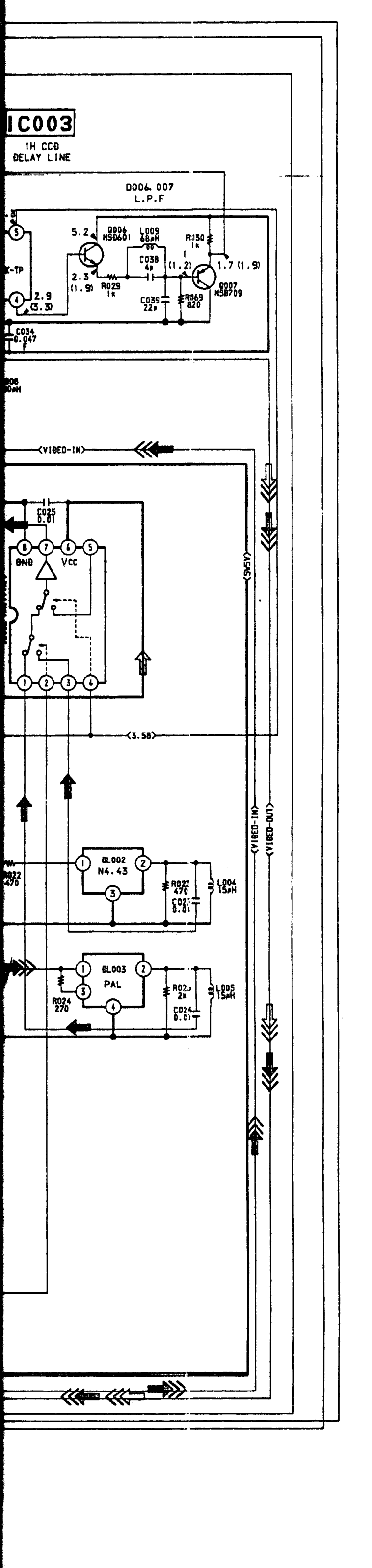


TO MA-181 BOARD CN304
(See page 4-17)

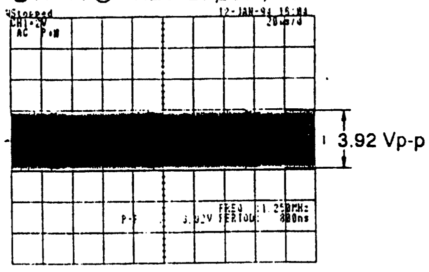


16 | 17 | 18

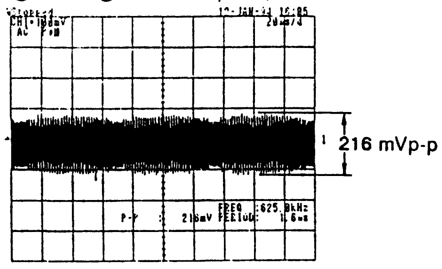
A B C D E F G H I J K L M N O



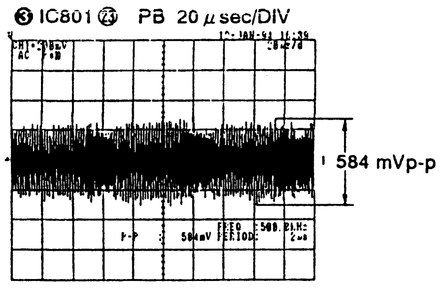
❶ IC801 ④ REC 20 μsec/DIV



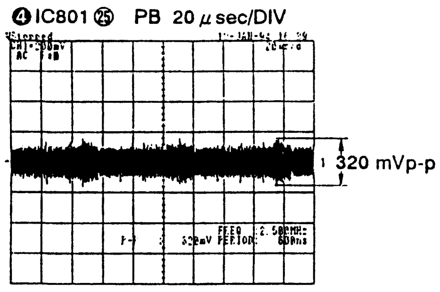
❷ IC801 ㉙ REC 20 μsec/DIV



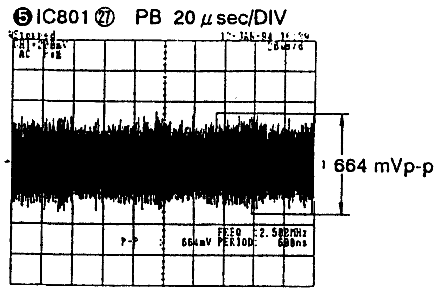
❸ IC801 ㉓ PB 20 μsec/DIV



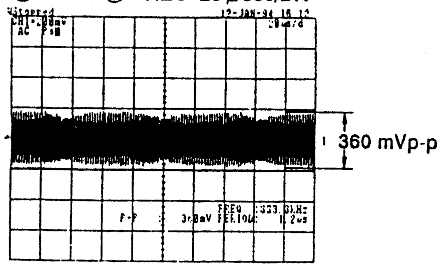
❹ IC801 ㉕ PB 20 μsec/DIV



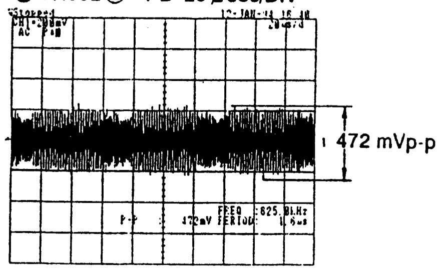
❺ IC801 ㉗ PB 20 μsec/DIV



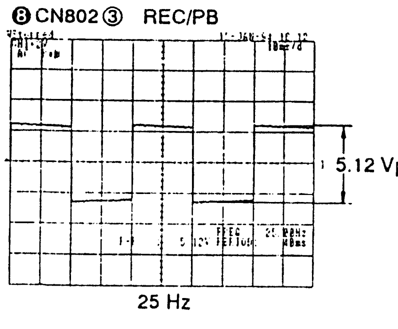
❻ CN802 ① REC 20 μsec/DIV



❼ CN802 ② PB 20 μsec/DIV

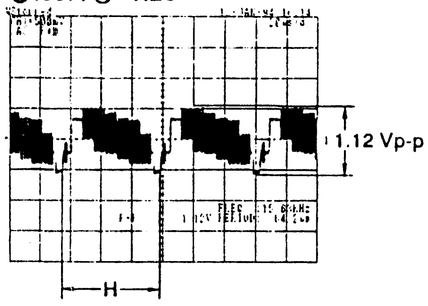


❽ CN802 ③ REC/PB

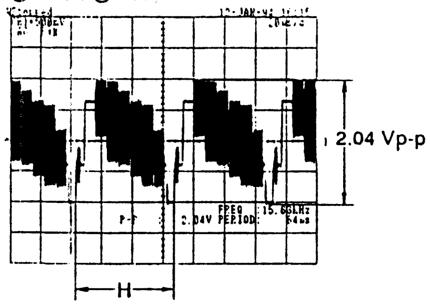


25 Hz

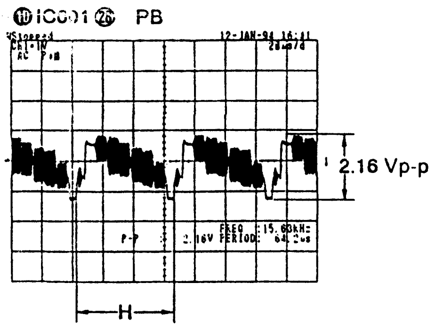
❾ IC001 ㉖ REC



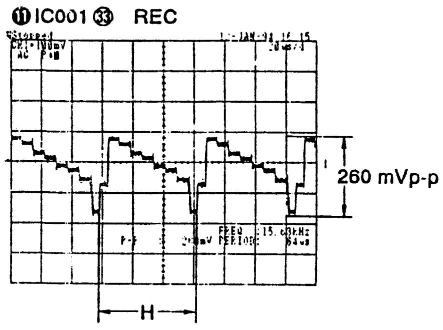
❿ IC001 ㉘ REC



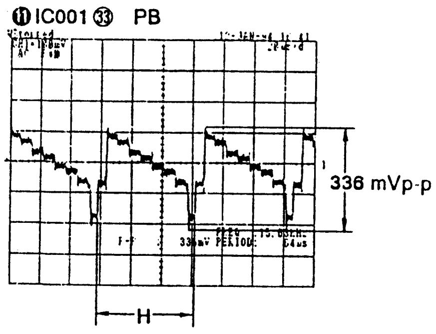
❿ IC001 ㉖ PB



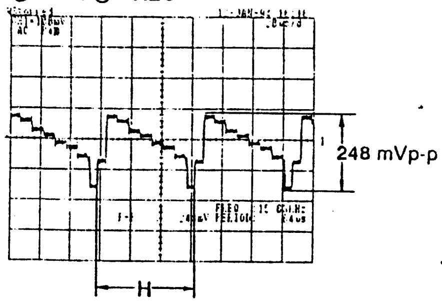
⓫ IC001 ㉝ REC



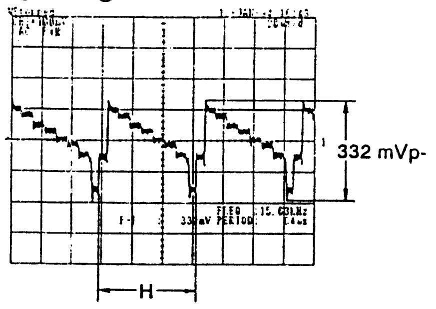
⓫ IC001 ㉝ PB



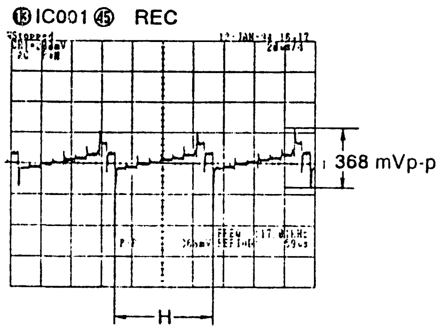
⓬ IC001 ㉜ REC



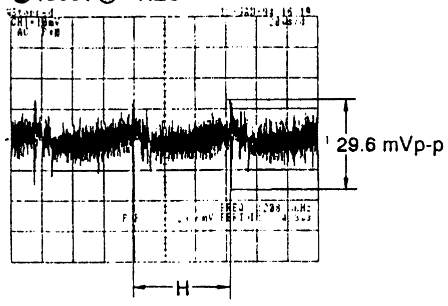
⓬ IC001 ㉜ PB



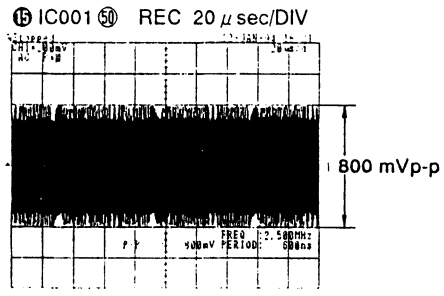
⓭ IC001 ㊺ REC



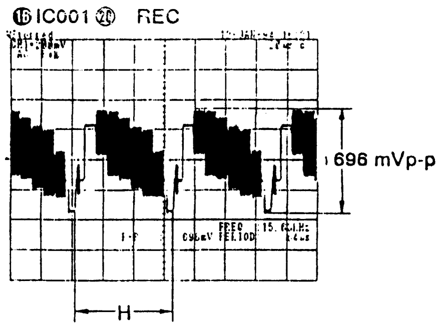
⓮ IC001 ㊼ REC



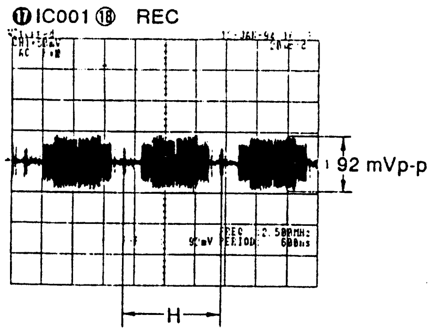
⓯ IC001 ㊿ REC 20 μsec/DIV



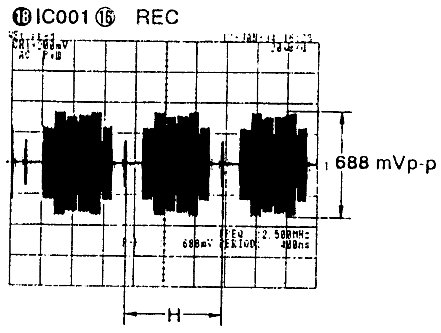
⓰ IC001 ⑳ REC



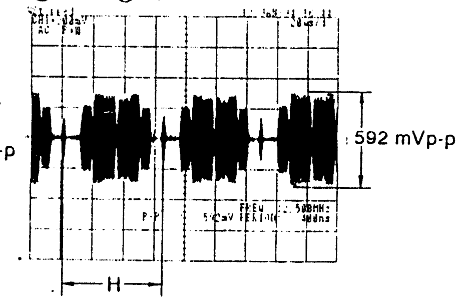
⓱ IC001 ⑱ REC



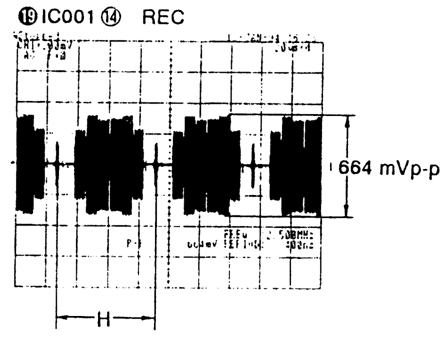
⓲ IC001 ⑯ REC



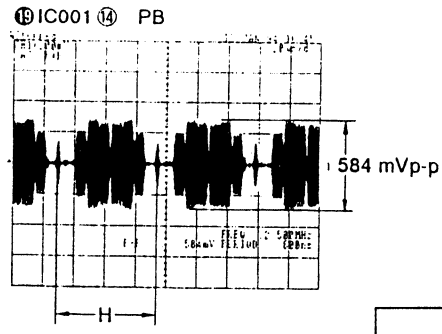
⓲ IC001 ⑯ PB



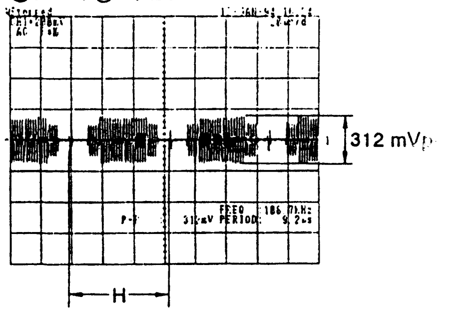
⓳ IC001 ⑭ REC



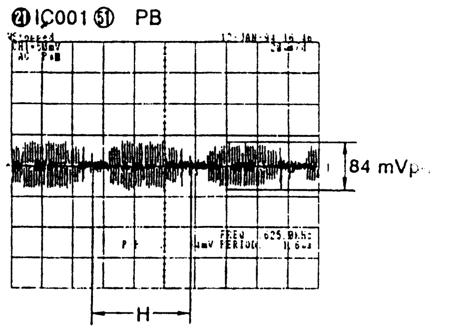
⓳ IC001 ⑭ PB



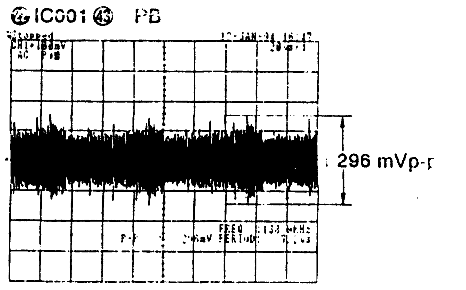
⓴ IC001 ㊸ REC



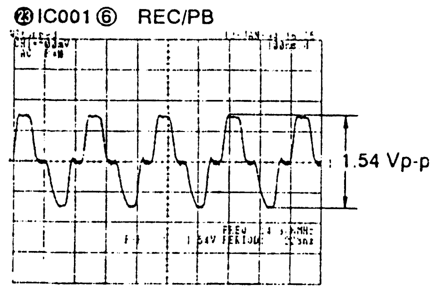
㉑ IC001 ㉛ PB



㉒ IC001 ㊸ PB

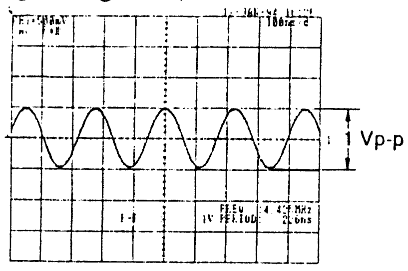


㉓ IC001 ⑥ REC/PB



4.43 MHz

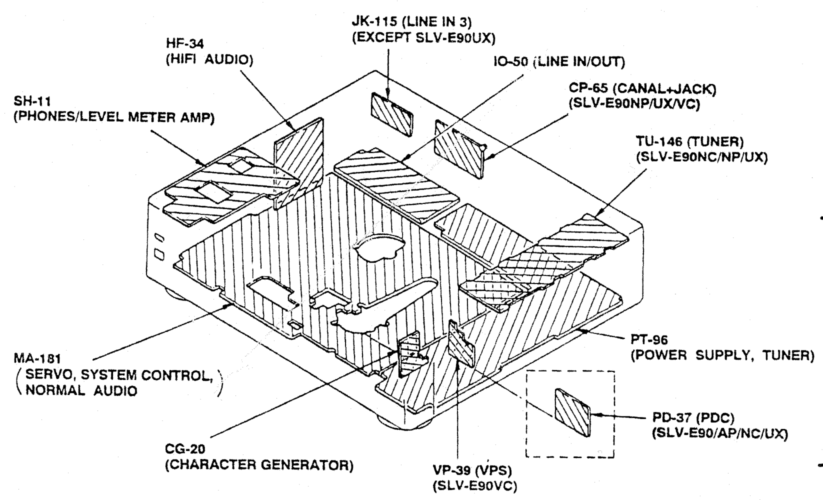
㉔ IC001 ⑦ REC/PB

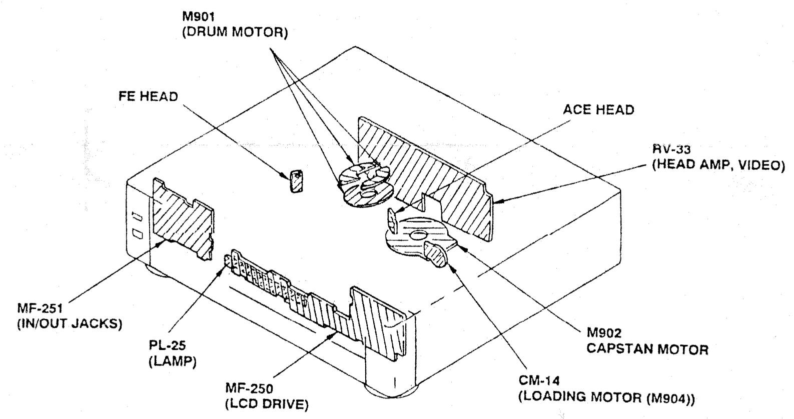


4.43 MHz

MA-181 (SERVO, SYSTEM CONTROL, NORMAL AUDIO), MF-251 (IN/OUT JACKS), JK-115 (LINE IN 3) PRINTED WIRING BOARDS

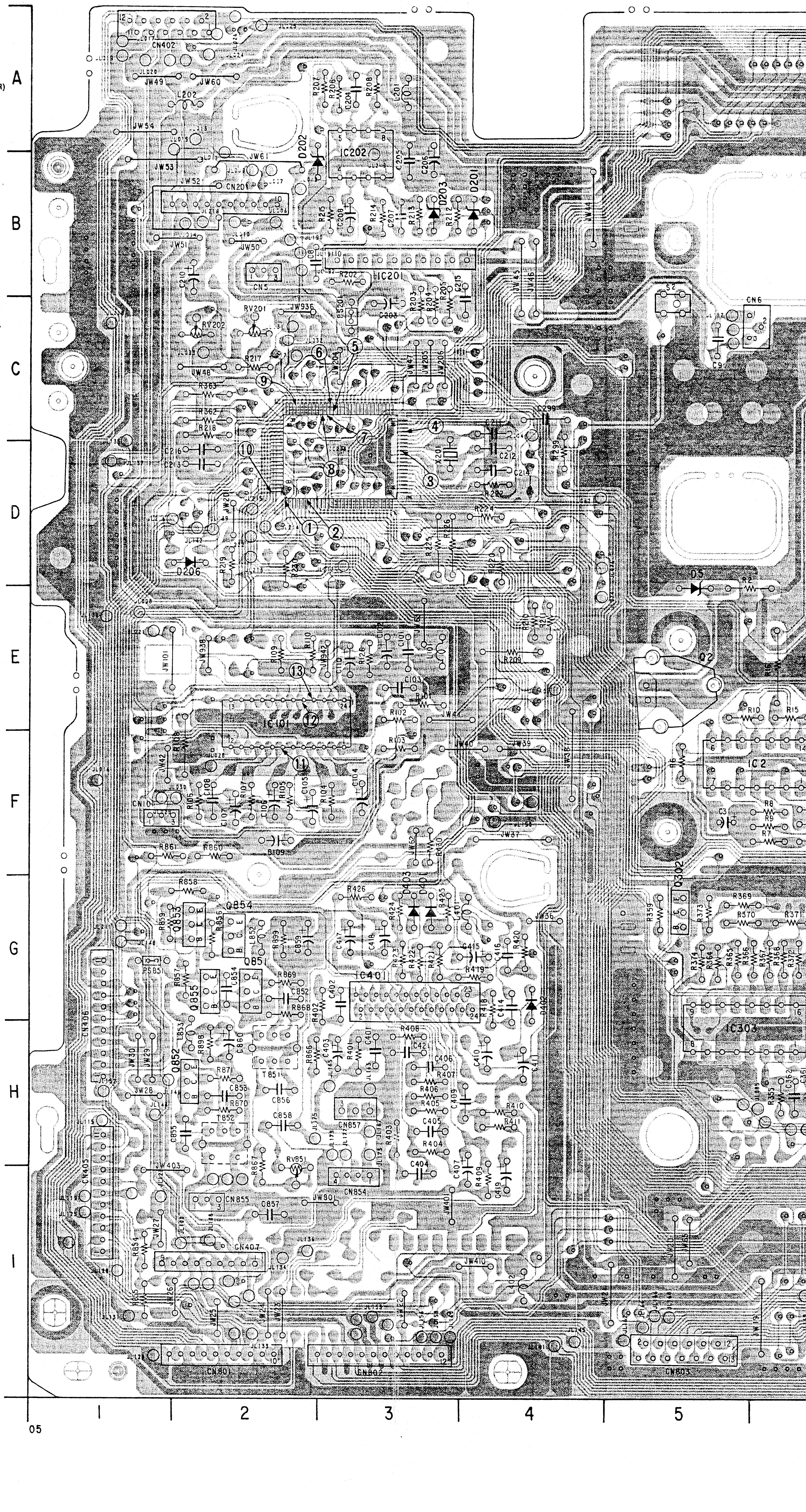
– Ref. No.: MA-181 Board; 2,000 series, MF-251 Board; 5,000 series, JK-115 Board; 8,000 series –





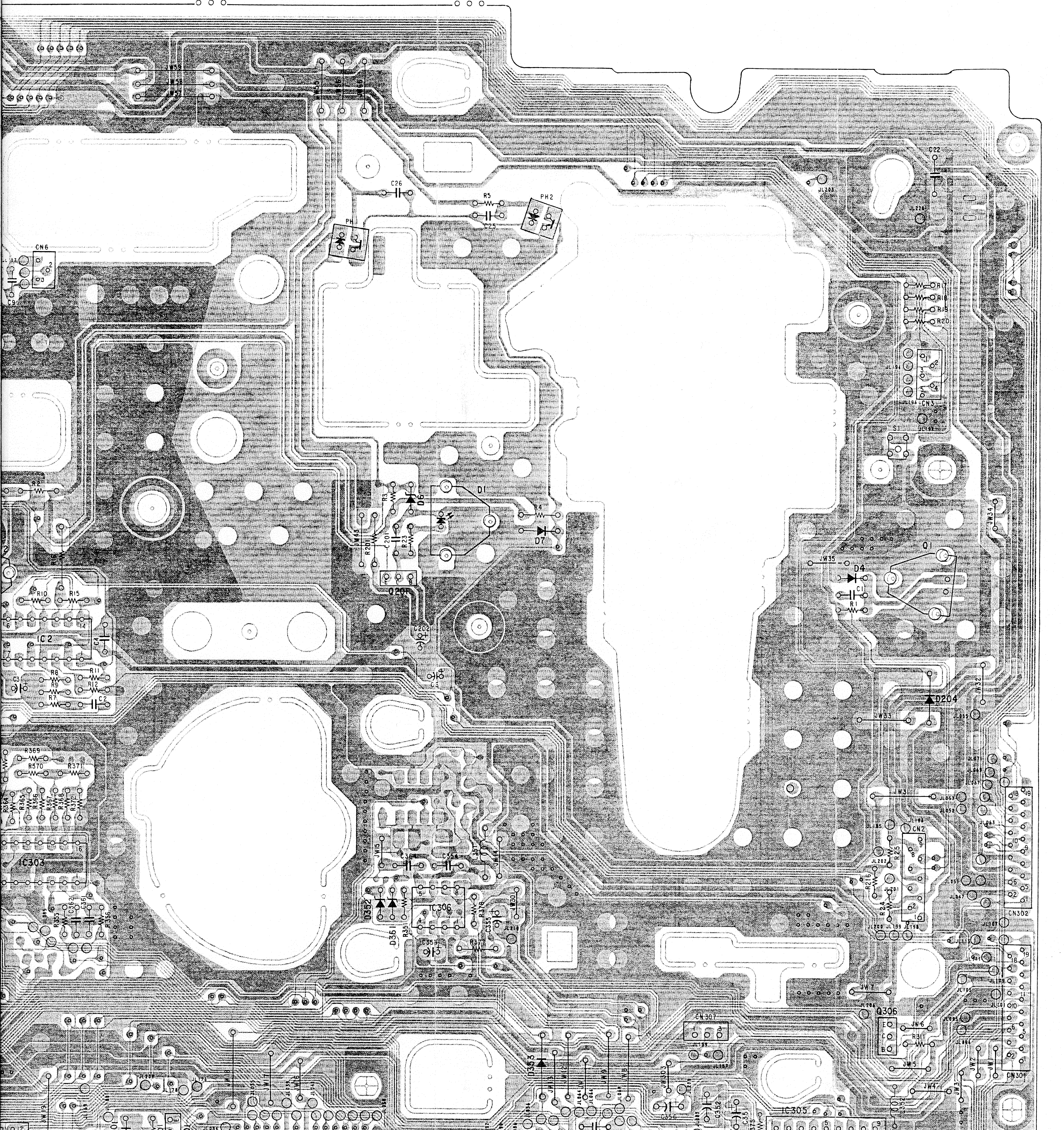
- There is no indication for destination in the printed wiring board diagram.

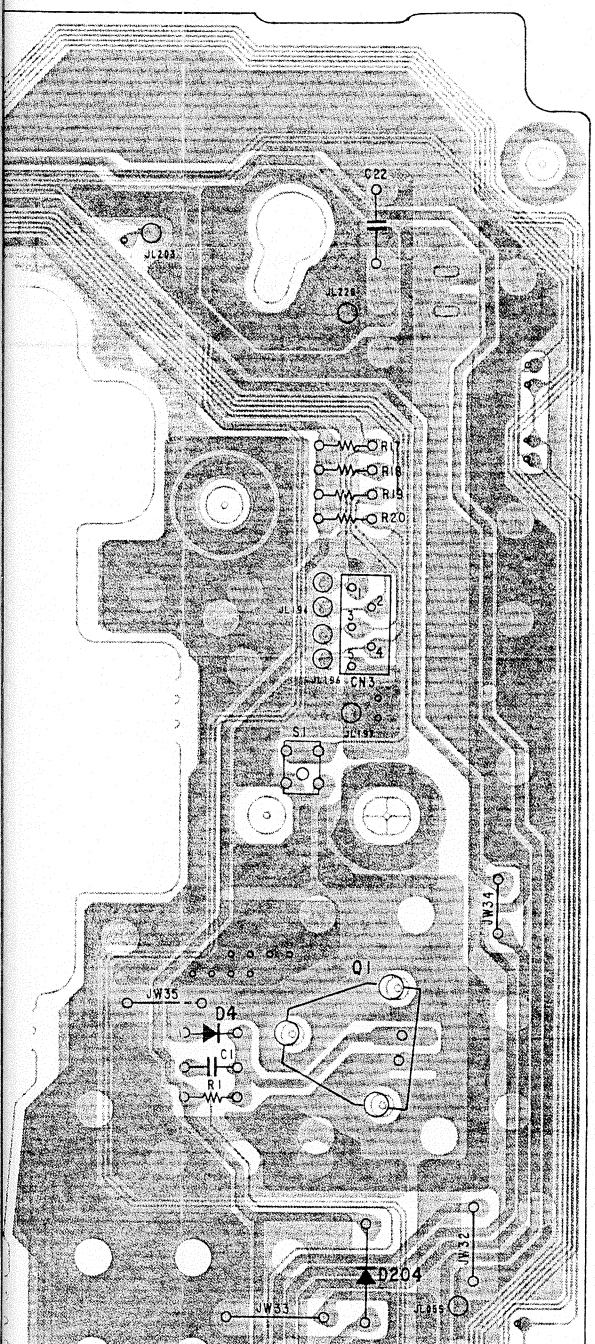
MA-181 BOARD



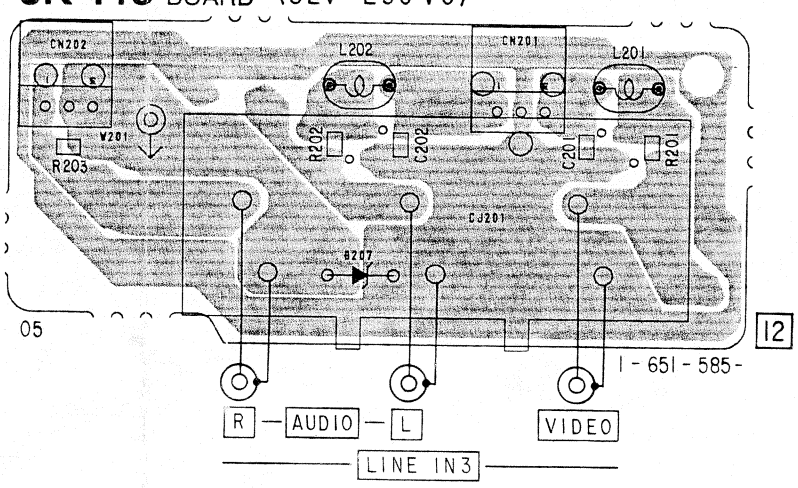
MA-181 BOARD

CN002	G-13
CN003	D-13
CN005	B-2
CN006	C-6
CN101	F-1
CN201	B-2
CN301	I-13
CN302	H-13
CN303	I-7
CN304	I-10
CN307	I-11
CN402	A-1
CN405	I-1
CN406	H-1
CN407	I-2
CN801	I-2
CN802	I-3
CN803	I-5
CN854	I-3
CN855	I-2
CN857	H-3
D001	E-9
D004	E-12
D005	D-5
D006	E-8
D007	E-10
D201	B-4
D202	A-2
D203	B-3
D204	F-13
D206	D-2
D351	H-8
D352	H-8
D353	I-10
D401	G-3
D402	G-4
D403	G-3
IC002	F-6
IC101	E-2
IC201	B-3
IC202	B-3
IC203	D-3
IC303	H-5
IC305	I-12
IC306	H-9
IC401	G-3
Q001	F-13
Q002	E-5
Q201	E-8
Q301	I-7
Q302	G-5
Q306	I-12
Q851	G-2
Q852	H-2
Q853	G-1
Q854	G-2
Q855	G-2

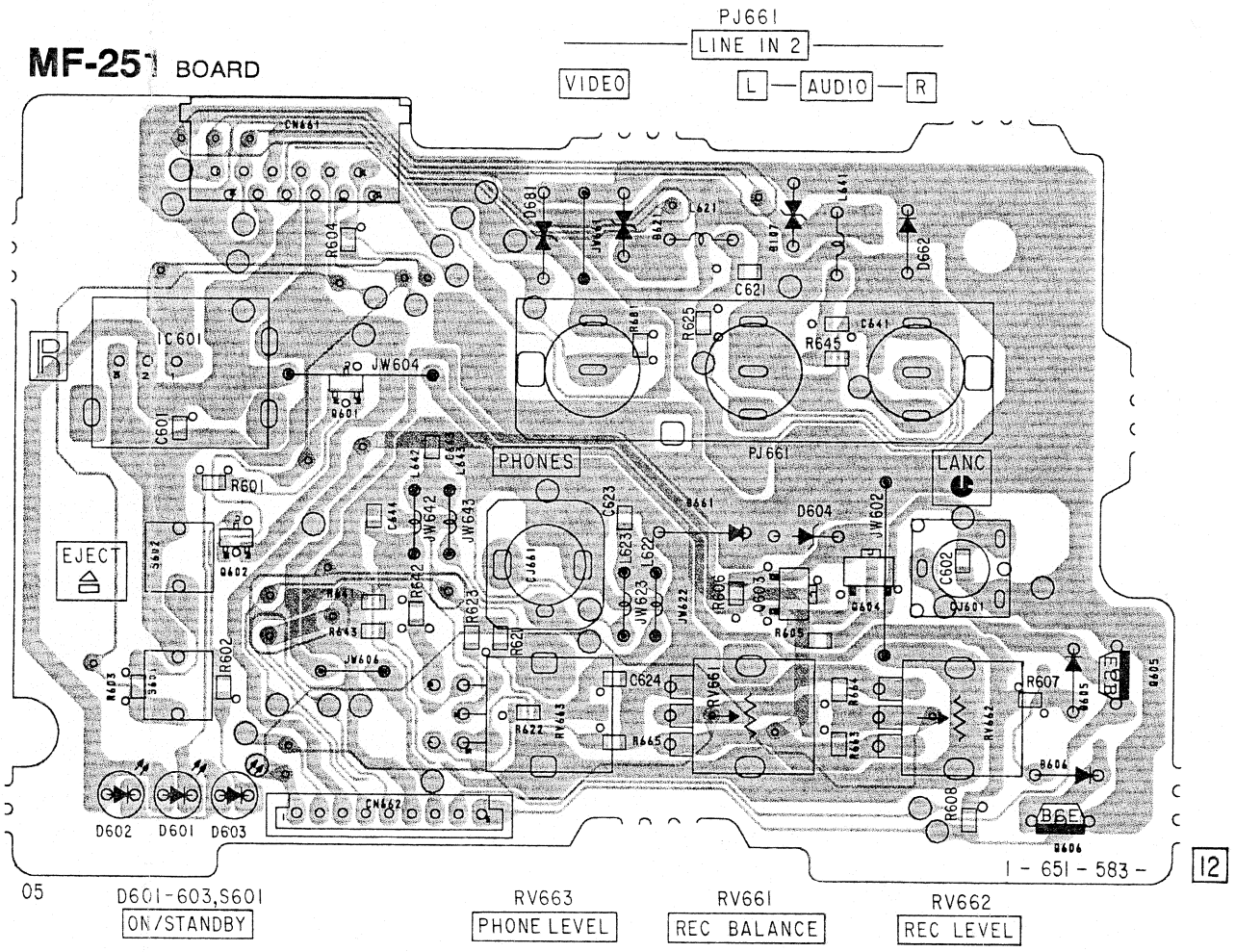

JW59
JW58
JW57
CN6
C9
C26
R5
C25
PH1
PH2
C22
JL203
JL228
R17
R18
R19
R20
CN3
S1
D1
R3
D6
R4
D7
JW43
R201
C201
R23
Q201
C202
R2
R10
R15
IC2
C4
C3
R8
R11
R9
R12
R7
C2
R369
R370
R371
R364
R365
R366
R367
R368
R372
IC303
C362
C361
R355
R356
JW15
C364
C354
L351
JW14
D352
IC306
R378
JW30
C355
D361
R351
C357
R377
Q1
JW35
D4
C1
R1
JW34
D204
JW32
JW33
JW31
CN2
R25
R216
R24
CN302
CN301
JW7
Q306
JW6
R311
JW5
JW4
JW3
JW2
JW1
CN307
JW303
C356
C352
C351
R375
IC305
L352
C398
R376
C399
CN304
C366
D353
JW19
D301
R301
Q301
JW18
JW17
JW16
CN303
1-650-237-
31
6
7
8
9
10
11
12
13



JK-115 BOARD (SLV-E90VC)



MF-251 BOARD

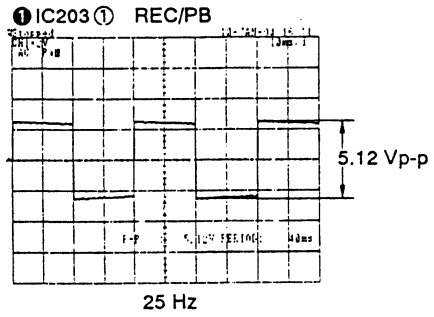


MA-181 (SERVO, SYSTEM CONTROL, NORMAL AUDIO), MF-251 (IN/OUT JACKS), JK-115 (LINE IN 3) SCHEMATIC DIAGRAM

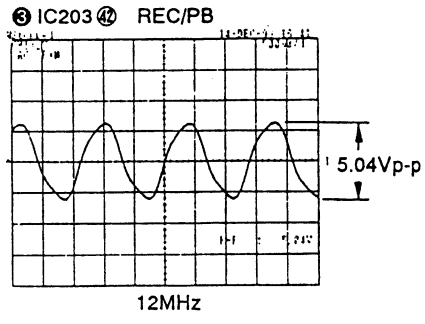
– Ref. No.: MA-181 Board; 2,000 series, MF-251 Board; 5,000 series, JK-115 Board; 8,000 series –

MA-181 BOARD

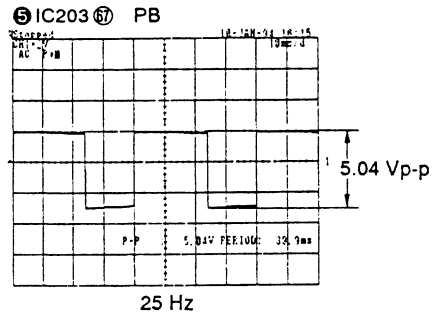
❶ IC203 ① REC/PB



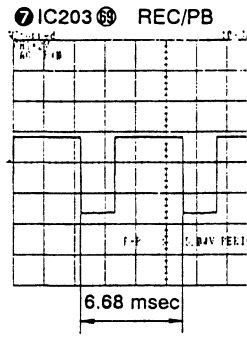
❸ IC203 ㊷ REC/PB



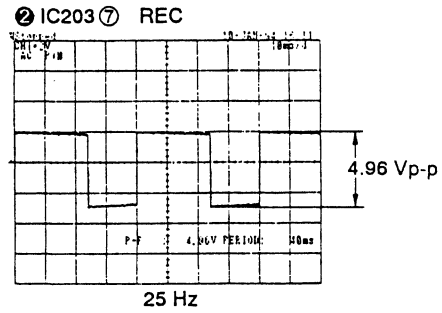
❺ IC203 ㊼ PB



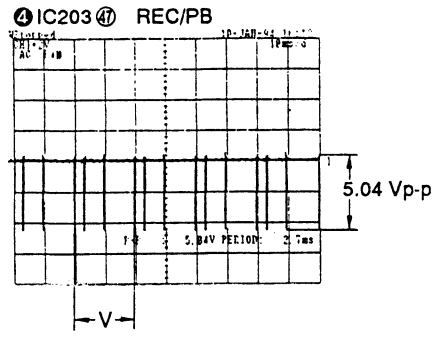
❼ IC203 ㊾ REC/PB



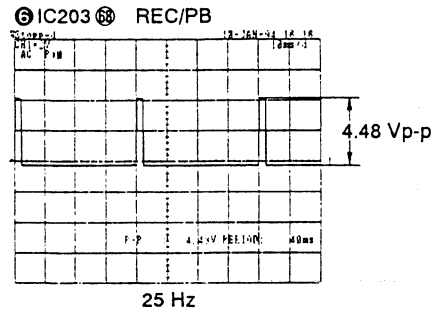
❷ IC203 ⑦ REC



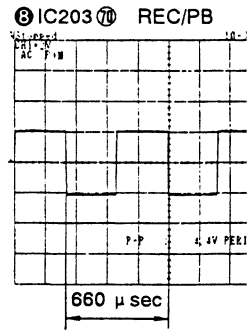
❹ IC203 ㊼ REC/PB



❻ IC203 ㊽ REC/PB

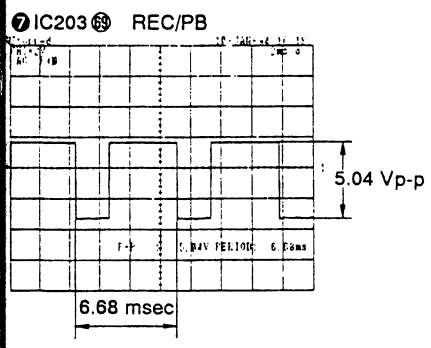


❽ IC203 ⑩ REC/PB

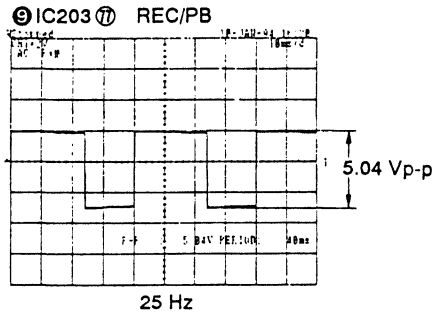


HEMATIC DIAGRAM

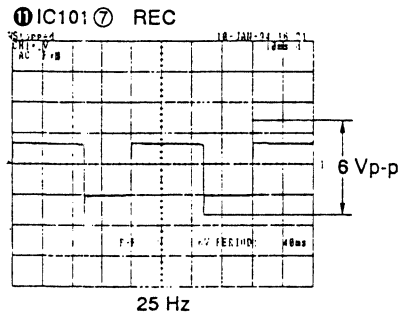
❼ IC203 ㊾ REC/PB



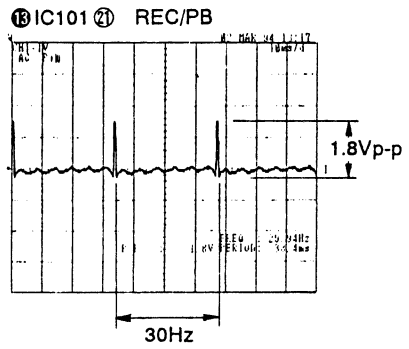
❾ IC203 ㊼ REC/PB



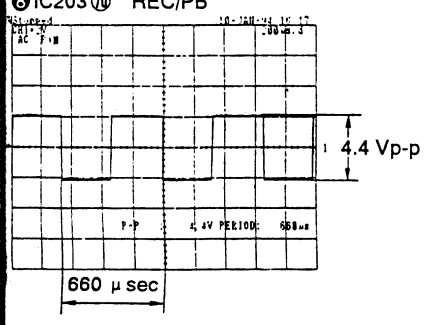
⓫ IC101 ⑦ REC



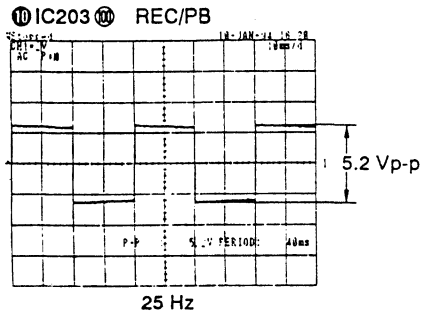
⓭ IC101 ㉑ REC/PB



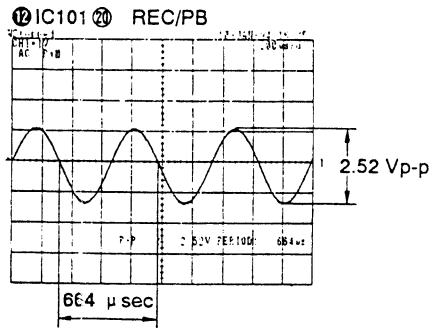
❽ IC203 ㊿ REC/PB



❿ IC203 ㊿ REC/PB



⓬ IC101 ⑳ REC/PB



No mark : COMMON (RE
( ) : PB
* : Impossible to r

● Signal path

	CHROMA
REC	➡
PB	⇨

(See page 4-22)
TO PT-96 BOARD CN402
(See page 4-22)
TO PT-96 BOARD CN401
(See page 4-47)
TO SH-11 BOARD CN801
(See page 4-35)
TO 10-50 BOARD CN704
(See page 4-8)
TO RV-33 BOARD CN001
(See page 4-8)
TO RV-33 BOARD CN002
(See page 4-47)
TO SH-11 BOARD CN802
(See page 4-33)
TO HF-34 BOARD CN102
(See page 4-45)
TO CP-65 BOARD (UX) CN903

IC002 WAVE SHARPER

IC201 CAM/LOAD MOTOR DRIVE

IC202 C.P/DRUM ERROR NITEGRATOR

IC203 SERVO SYSTEM CONTROL CPU

IC101 PB/REC CNTROL

IC303 SYNCHRO SERIAL BUS

IC305 VIDEO SWITCH

IC306 VIDEO SWITCH

M901 DRUM MOTOR

JK-115 BOARD
(NP, NC, IT, VC, AP MODEL ONLY)

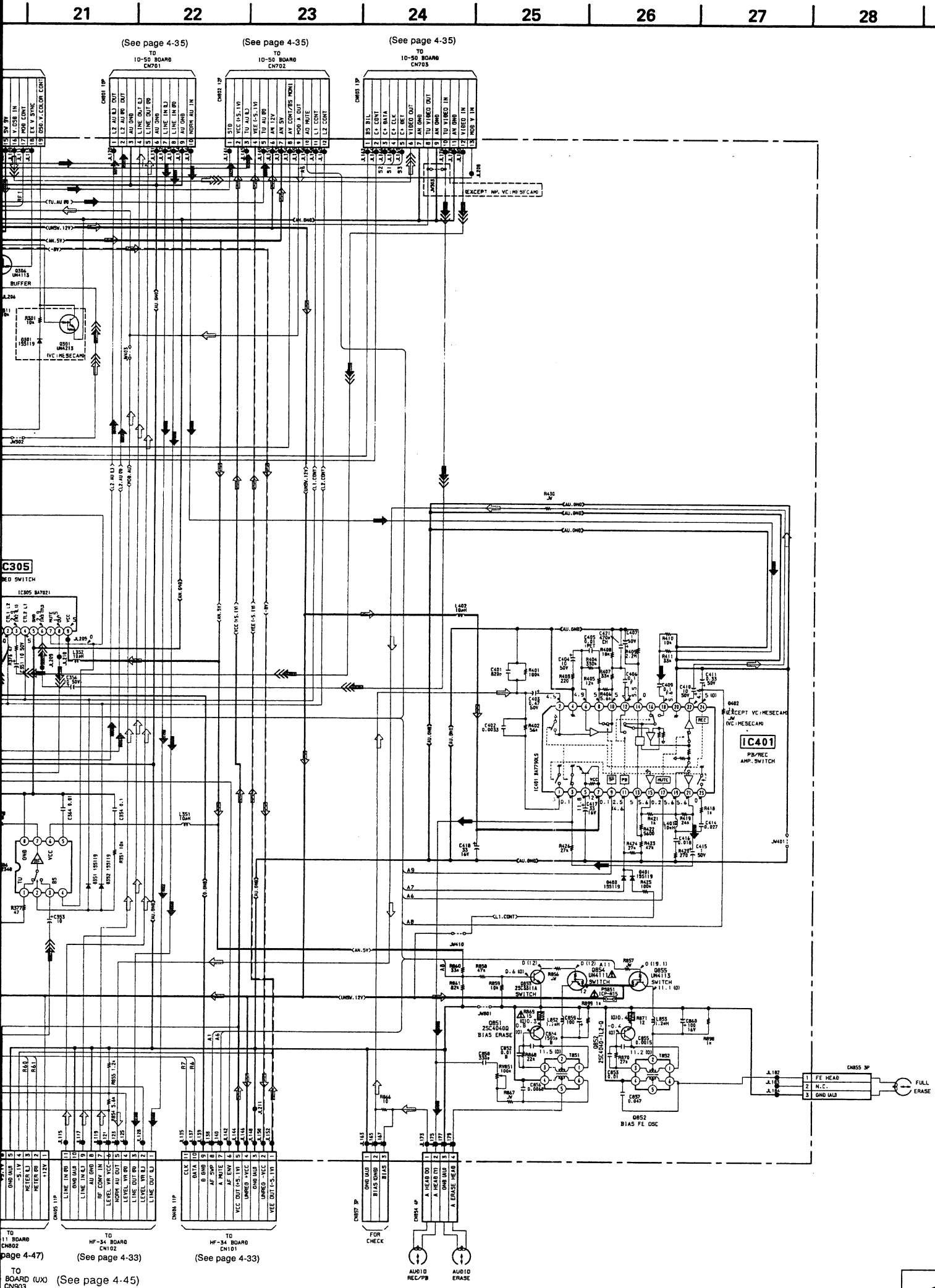
No mark : COMMON (REC)
( ) : PB
* : Impossible to measure the voltage at the marked points.

• Signal path

	VIDEO SIGNAL			AUDIO SIGNAL
	CHROMA	Y	Y/CHROMA	
REC	➡	➡	➡	➡
PB	⇨	⇨	⇨	⇨

• Signal path

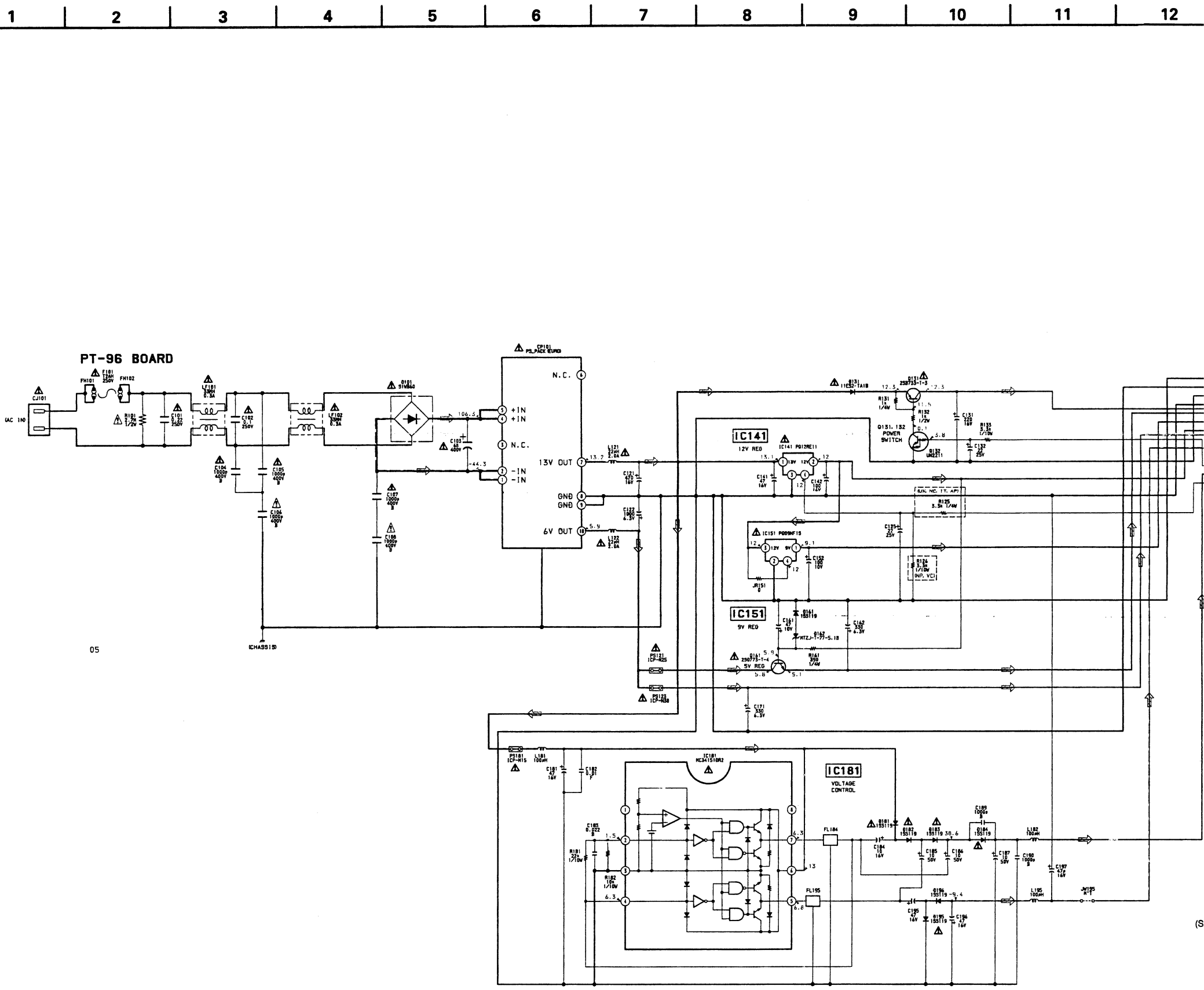
	REC	REC/PB	PB
Drum speed servo		▷	
Drum phase servo		▷»	
Drum servo (speed and phase)		▷»»	
Capstan speed servo		▷	
Capstan phase servo	▷»	▷»	▷»
Capstan servo (speed and phase)		▷»»	
Ref. signal	▷		▷

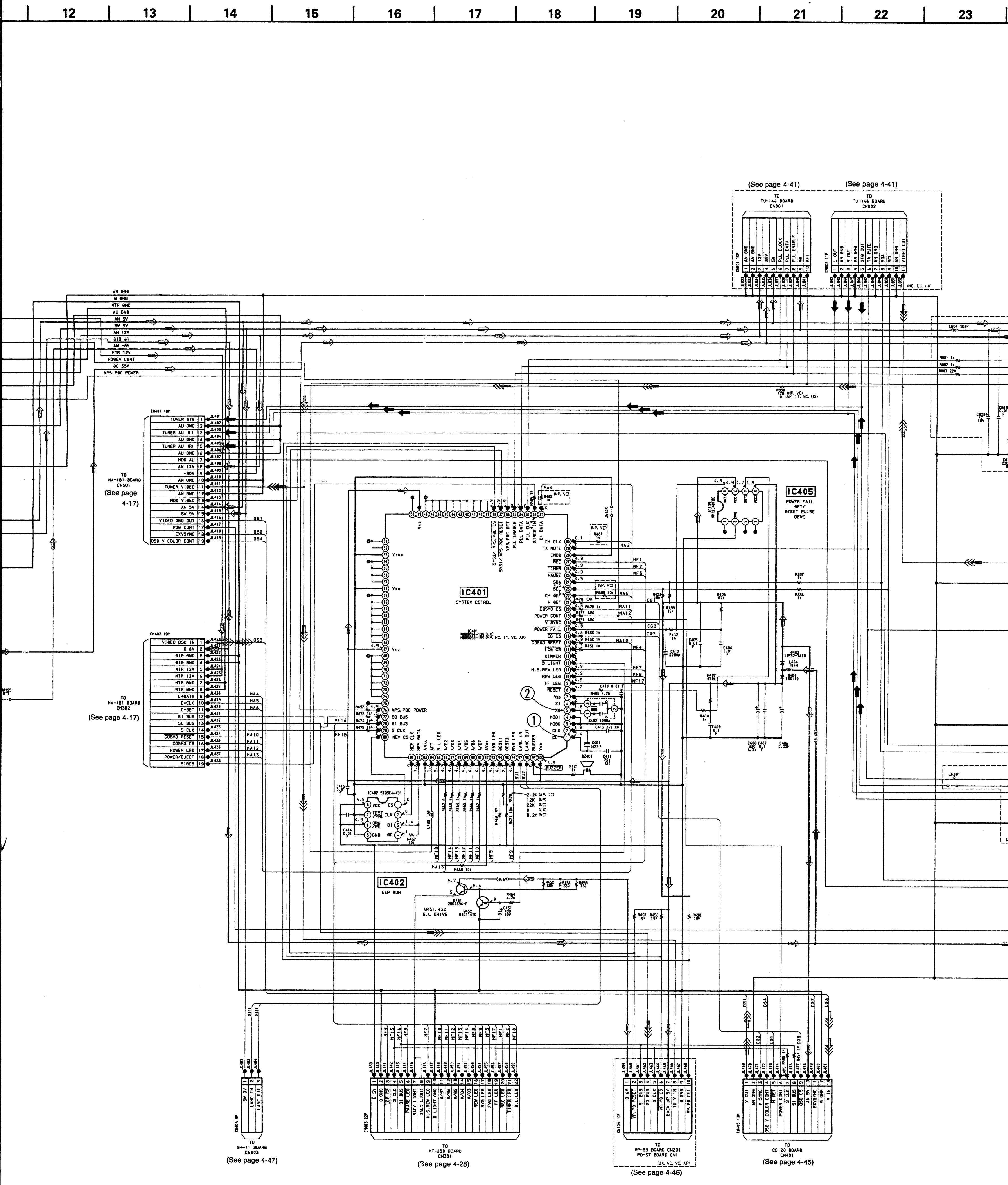


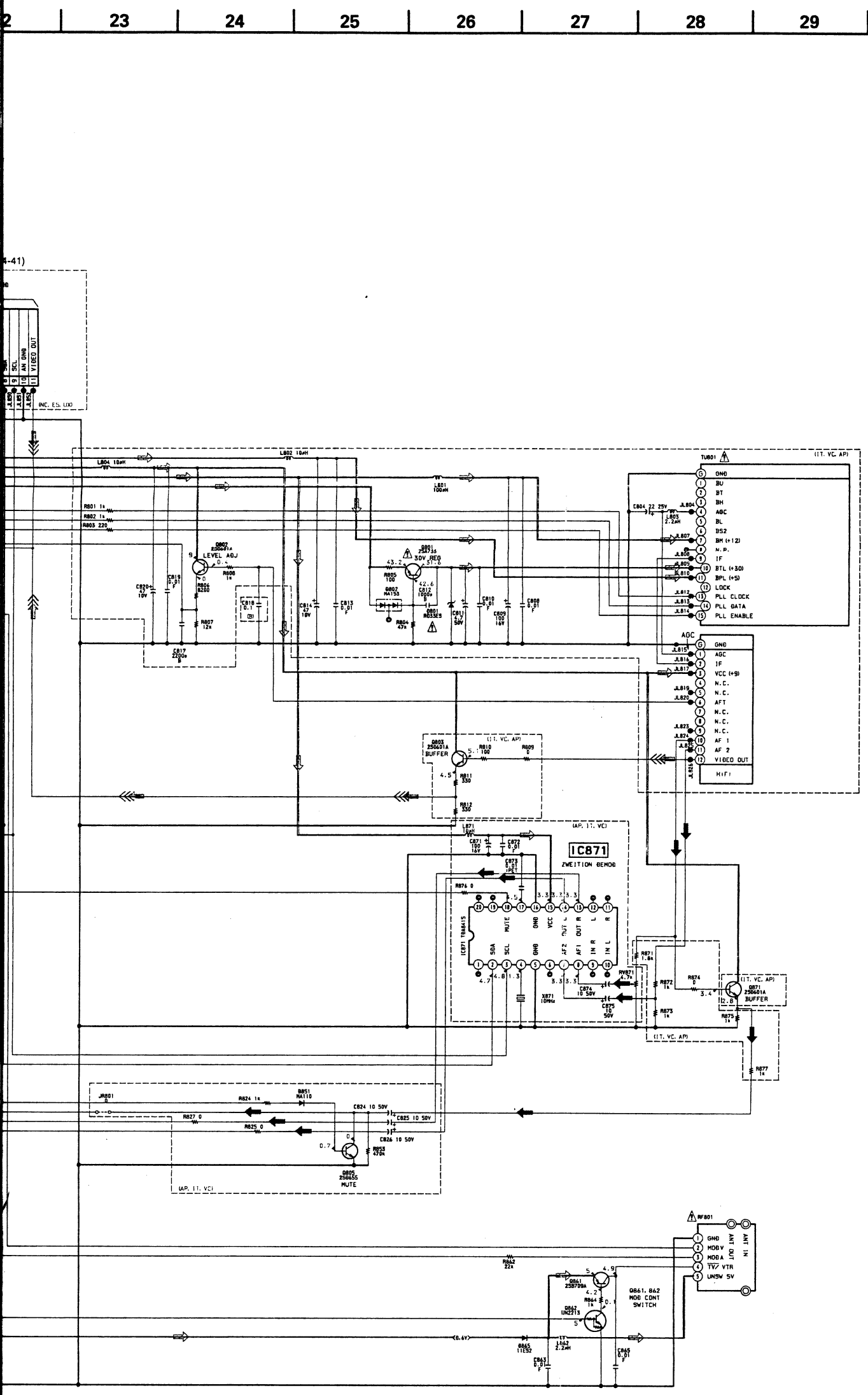
SERVO, SYSTEM CONTROL

PT-96 (TUNER, TIMER, MODE CONTROL) SCHEMATIC DIAGRAM

– Ref. No.: PT-96 Board; 3,000 series –



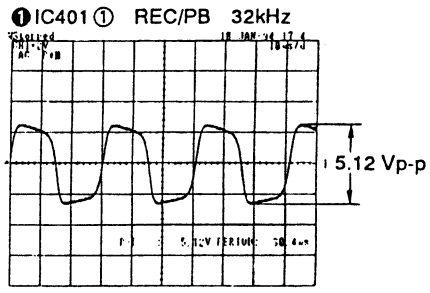

12
13
14
15
16
17
18
19
20
21
22
23
(See page 4-41)
TO TU-146 BOARD CN001
CN801 10P
AN GND
AN GND
12V
35V
5V
PLL CLOCK
PLL DATA
PLL ENABLE
9V
AFT
(See page 4-41)
TO TU-146 BOARD CN002
CN802 11P
L OUT
AN GND
R OUT
AN GND
STD OUT
TA MUTE
AN GND
SDA
SCL
AN GND
VIDEO OUT
(NC, ES, UX)
AN GND
D GND
MTR GND
AU GND
AN 5V
SW 9V
AN 12V
DIG 6V
AN -8V
MTR 12V
POWER CONT
DC 35V
VPS. PDC POWER
CN401 19P
TUNER STD
AU GND
TUNER AU (L)
AU GND
TUNER AU (R)
AU GND
MOD AU
AN 12V
-30V
AN GND
TUNER VIDEO
AN GND
MOD VIDEO
AN 5V
SW 9V
VIDEO OSD OUT
MOD CONT
EXVSYNC
OSD V COLOR CONT
TO MA-181 BOARD CN301
(See page 4-17)
CN402 19P
VIDEO OSD IN
D 6V
DIG GND
DIG GND
MTR 12V
MTR 12V
MTR GND
MTR GND
C+DATA
C+CLK
C+DET
SI BUS
SO BUS
S CLK
COSMO RESET
COSMO CS
POWER LED
POWER/EJECT
SIRCS
TO MA-181 BOARD CN302
(See page 4-17)
IC401
SYSTEM COTROL
IC401 MB89096-129 (UX) MB89095-159 (NP, NC, IT, VC, AP)
SYS2/ VPS. PDC CS
SYS1/ VPS. PDC RESET
VPS. PDC DET
PLL ENABLE
PLL DATA
PLL CLK
SIRCS IN
C+ DATA
C+ CLK
TA MUTE
CMOD
REC
TIMER
PAUSE
SDA
SCL
C+ DET
H DET
COSMO CS
POWER CONT
V SYNC
POWER FAIL
CG CS
COSMO RESET
LCD CS
DIMMER
B.LIGHT
H.S.REW LED
REW LED
FF LED
RESET
Vss
X1
X0
MOD1
MOD0
CL0
CL1
VPS. PDC POWER
SO BUS
SI BUS
S CLK
MEM CS
MEM CLK
MEM DATA
AVss
AFT
B.L.LED
FWD LED
DEST1
DEST2
RVS LED
LANC IN
LANC OUT
BUZZER
Vcc
BUZZER
BZ401
X401 32KHz
X402 10MHz
IC402 ST93C46AB1
IC402
EEP ROM
Q451, 452 B.L DRIVE
Q451 2SD2394-F
Q452 DTC114TK
2.2K (AP, IT)
12K (NP)
22K (NC)
0 (UX)
8.2K (VC)
IC405
POWER FAIL DET/ RESET PULSE GENE
IC405 MM1254XFBE
D403 11ES2-TA1B
D404 1SS119
L404 10µH
R836 470 (NP, VC) 0 (AP, IT, NC, UX)
L804 10µH
R801 1k
R802 1k
R803 220
JR801 0
CN406 3P
SW 9V
LANC IN
LANC OUT
TO SH-11 BOARD CN803
(See page 4-47)
CN403 22P
D 5V
D GND
LCD CS
S CLK
SI BUS
PAUSE LED
BACK LIGHT
BACK LIGHT
H.S.REW LED
B.LIGHT GND
A/D7
A/D6
A/D5
A/D4
A/D3
REW LED
RVS LED
FWD LED
FF LED
REC LED
TIMER LED
B.L.LED
TO MF-250 BOARD CN301
(See page 4-28)
CN404 10P
D 6V
VP. PD PESET
SI BUS
SO BUS
S CLK
VP. PD CS
BACK UP 5V
TU V IN
D GND
VP. PD DET
TO VP-39 BOARD CN201 PD-37 BOARD CN1
(UX, NC, VC, AP)
(See page 4-46)
CN405 13P
V OUT
AN GND
V SYNC
OSD V COLOR CONT
H DET
POWER CONT
S CLK
SI BUS
OSD CS
AN 5V
EXVSYNC
D GND
V IN
TO CG-20 BOARD CN401
(See page 4-45)



Note: The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety.
Replace only with part number specified.

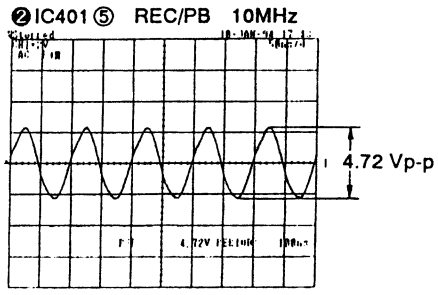
PT-96 BOARD

❶ IC401 ① REC/PB 32kHz



32 kHz

❷ IC401 ⑤ REC/PB 10MHz



10 MHz

No mark : COMMON (REC)
( ) : PB
* : Impossible to measure the voltage at the marked points.

- Signal path

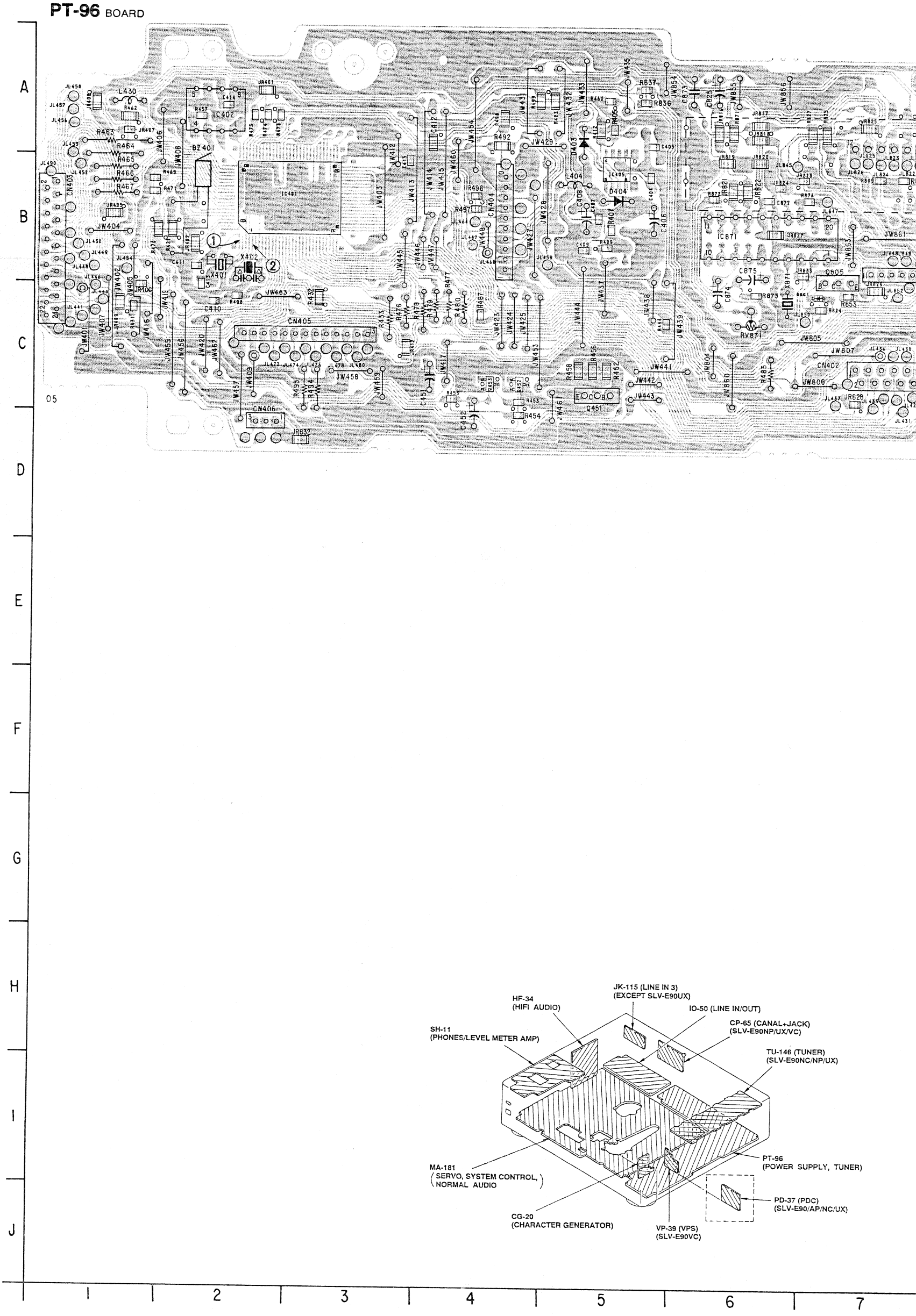
	VIDEO SIGNAL			AUDIO SIGNAL
	CHROMA	Y	Y/CHROMA	
REC	➡	➡	➡	➡
PB	⇨	⇨	⇨	⇨

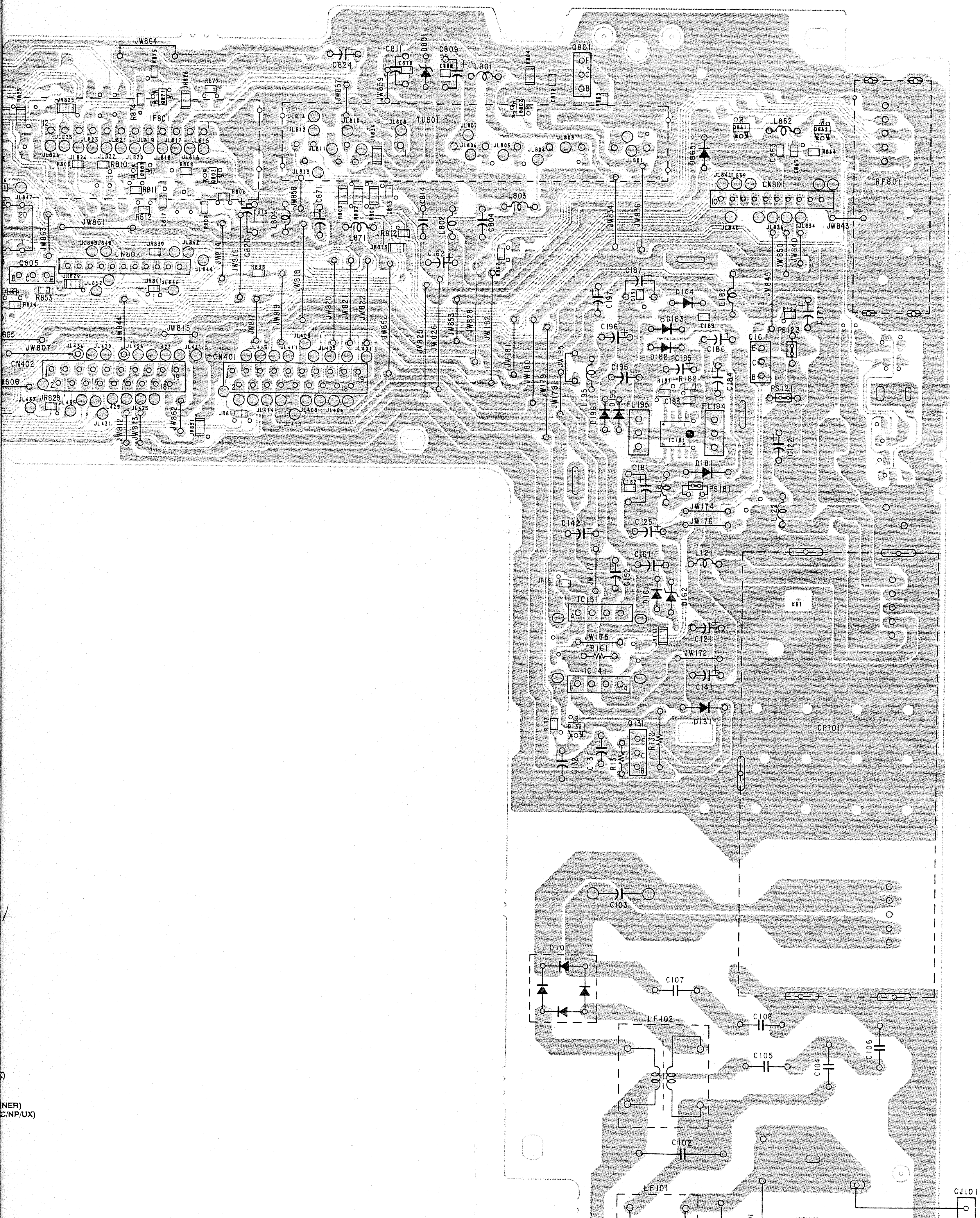
PT-96 (TUNER, TIMER, MODE CONTROL) PRINTED WIRING BOARD

– Ref. No.: PT-96 Board; 3,000 series –

- There is no indication for destination in the printed wiring board diagram.

PT-96 BOARD





PT-96 BOARD

CN401	C-8
CN402	C-7
CN403	B-1
CN404	B-4
CN405	C-2
CN406	D-2
CN801	B-12
CN802	B-7
D101	G-11
D131	F-12
D161	E-11
D162	E-11
D181	D-11
D182	C-11
D183	C-11
D184	C-11
D195	C-11
D196	C-11
D403	A-5
D404	B-5
D801	A-10
D802	A-10
D851	C-6
D865	A-12
IC141	E-11
IC151	E-11
IC181	D-11
IC401	B-2
IC402	A-2
IC405	B-5
IC871	B-6
Q131	F-11
Q132	F-11
Q161	C-12
Q451	C-5
Q452	C-4
Q453	C-4
Q801	A-11
Q802	B-8
Q803	B-8
Q805	B-7
Q861	A-12
Q862	A-12
Q871	A-8

)

NER)
C/NP/UX)

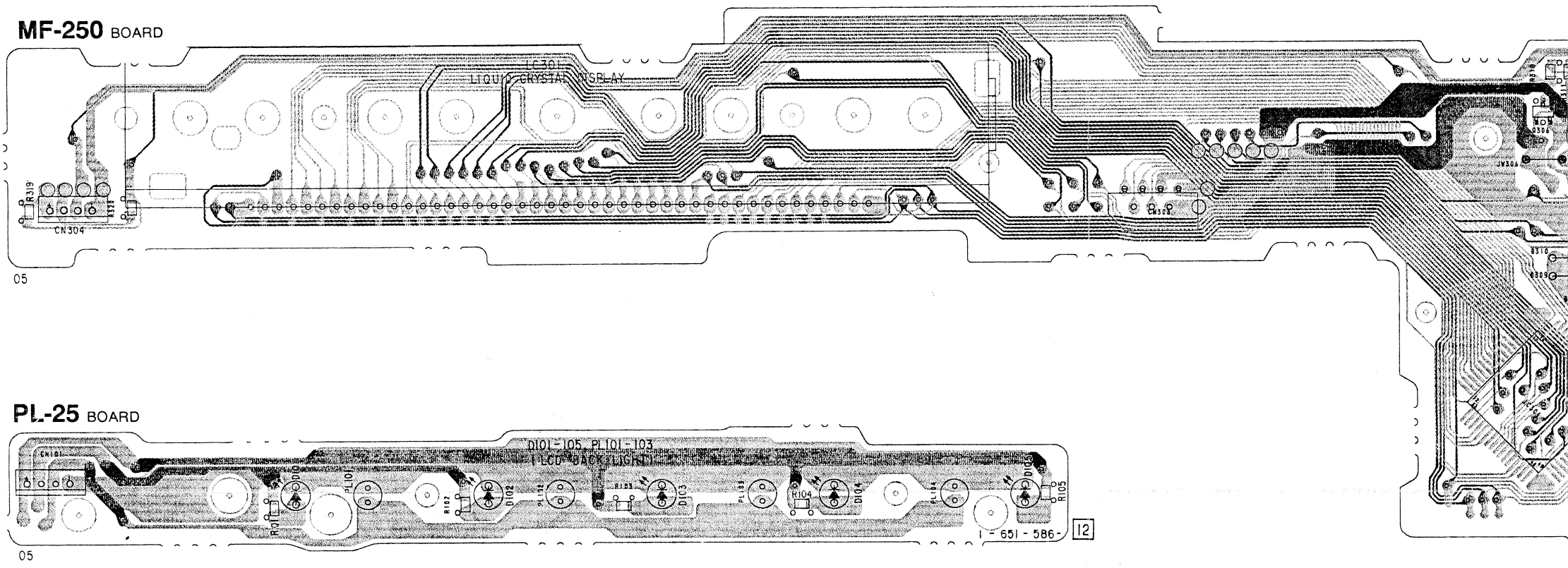
JPPLY, TUNER)

DC)
/AP/NC/UX)

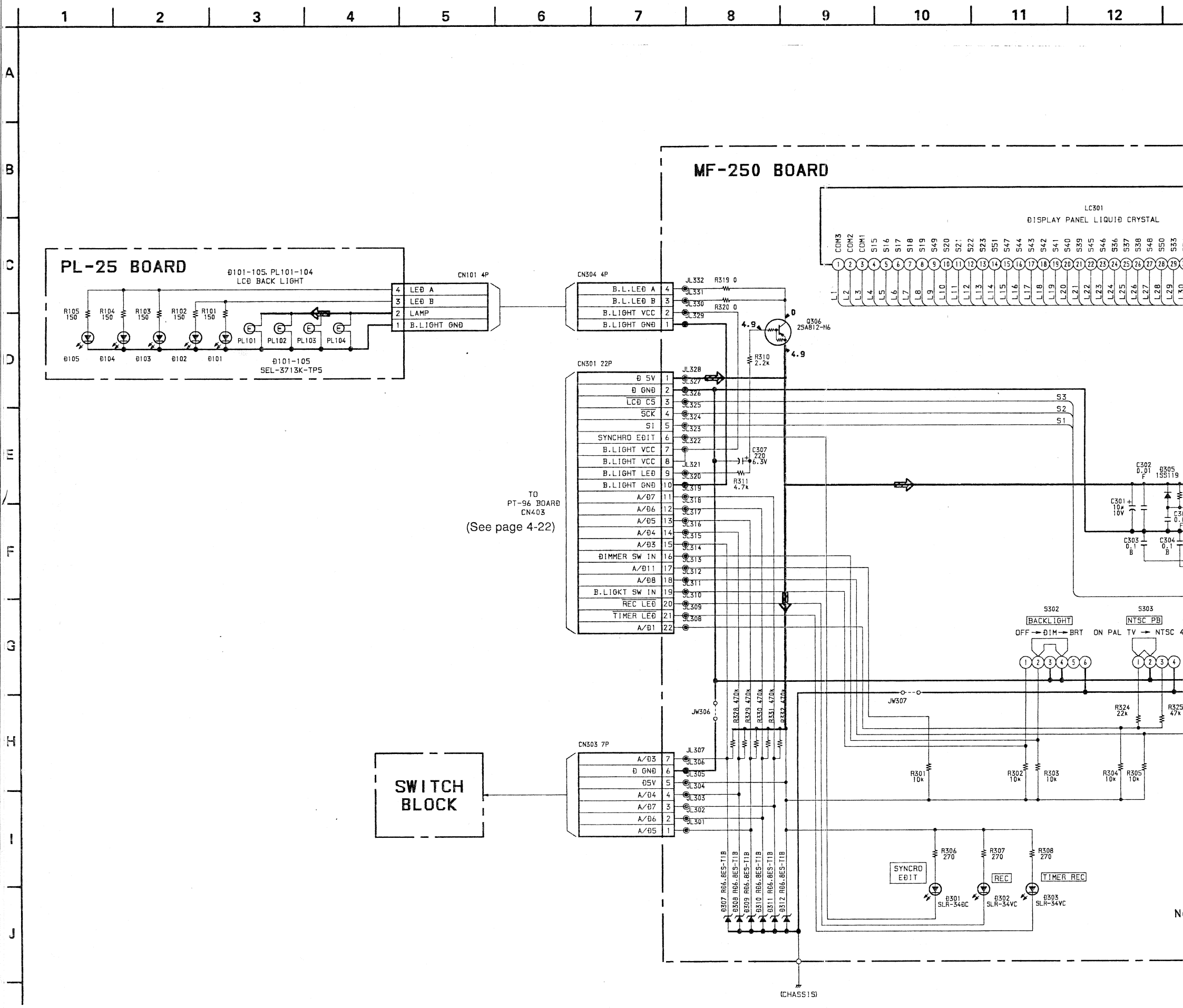
MF-250 (LCD DRIVE), PL-25 (LAMP) PRINTED WIRING BOARDS AND SCHEMATIC DIAGRAM

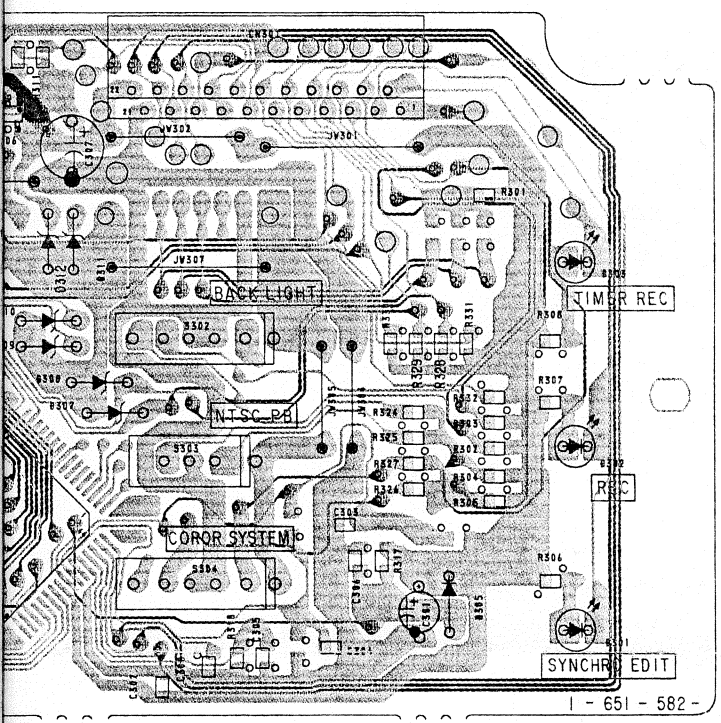
– Ref. No.: MF-250 and PL-25 Boards; 5,000 series –

MF-250 BOARD

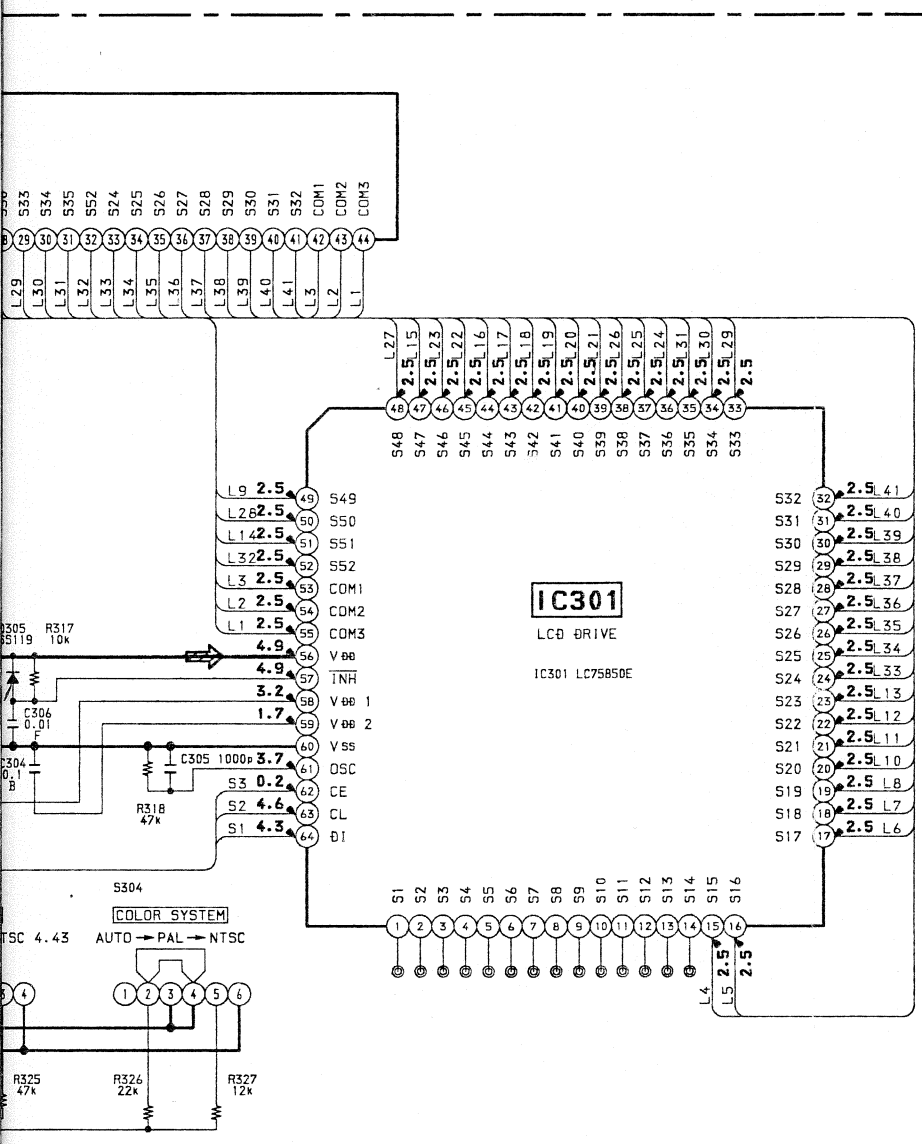


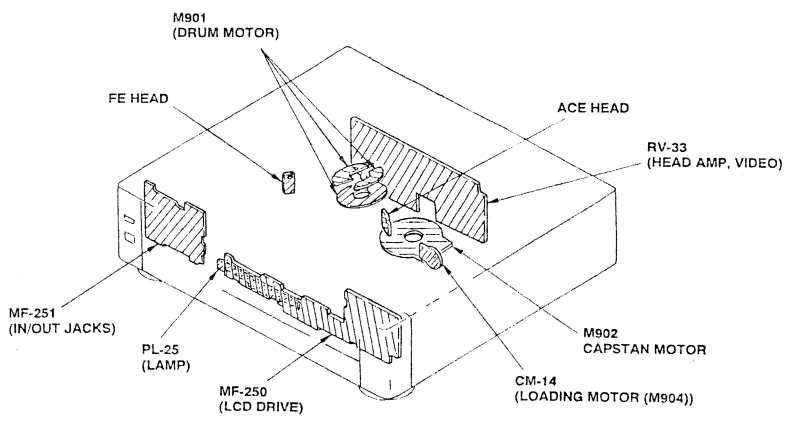
PL-25 BOARD





13 | 14 | 15 | 16 | 17 | 18

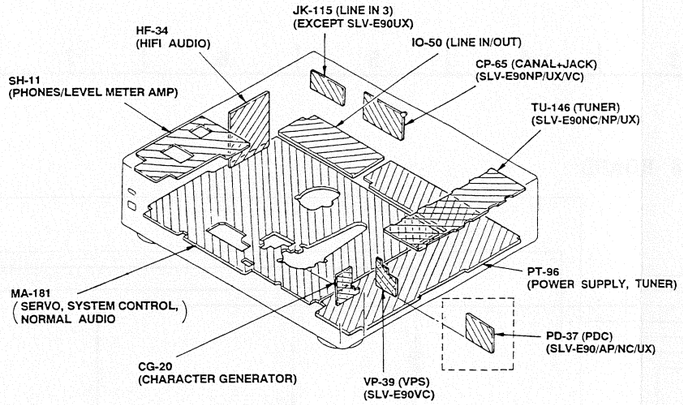




No Mark:E-E MODE

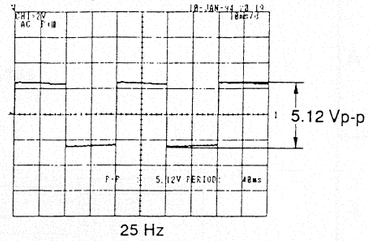
HF-34 (HiFi AUDIO) PRINTED WIRING BOARD AND SCHEMATIC DIAGRAM

– Ref. No.: HF-34 Board; 6,000 series –

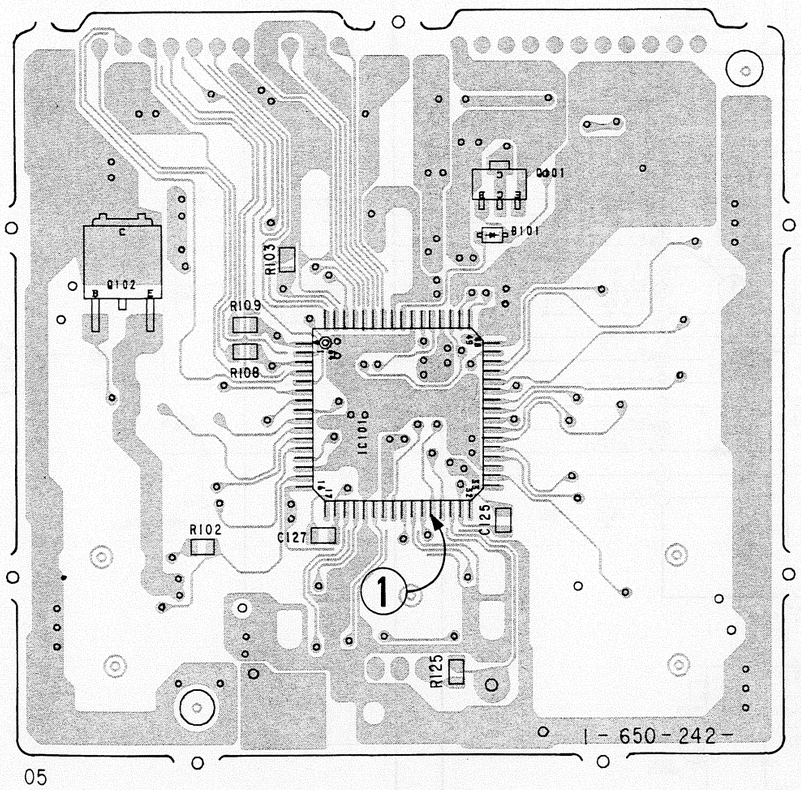


HF-34 BOARD

❶ IC101 ㉓ REC/PB

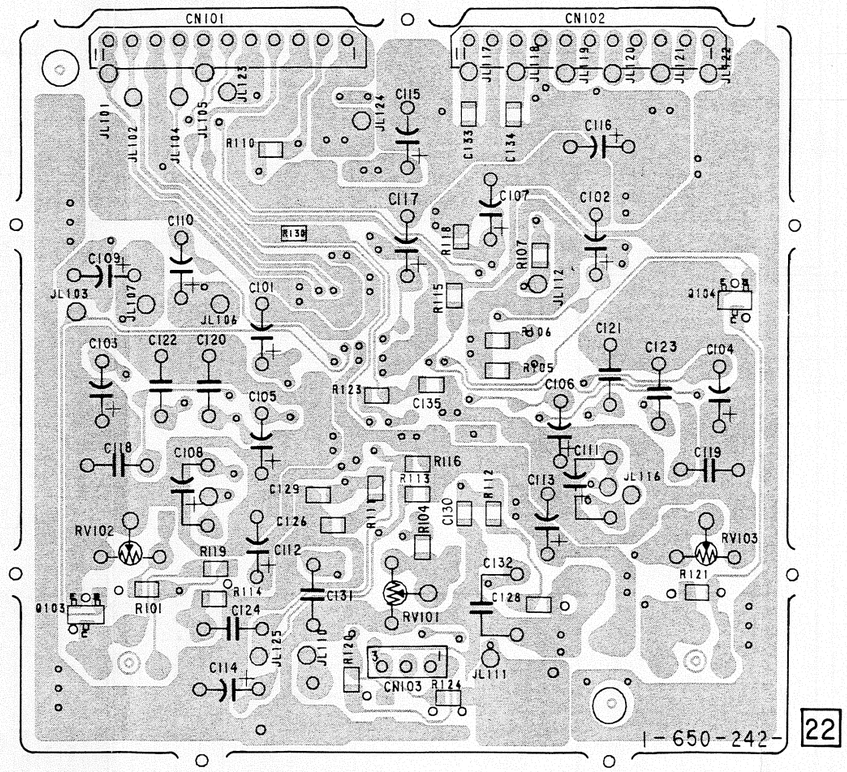


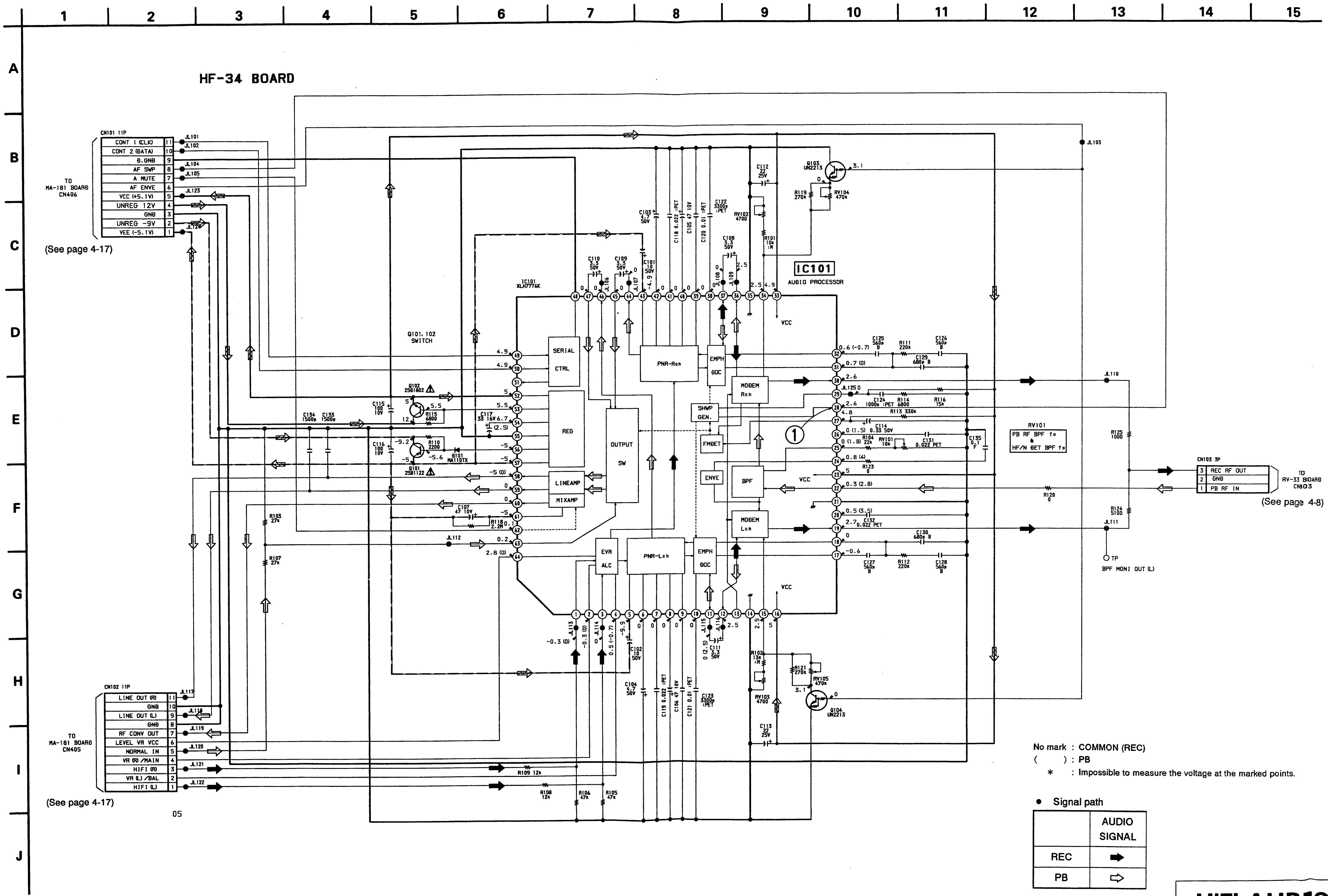
HF-34 BOARD (COMPONENT SIDE)



05

HF-34 BOARD (CONDUCTOR SIDE)





No mark : COMMON (REC)
( ) : PB
* : Impossible to measure the voltage at the marked points.

● Signal path

	AUDIO SIGNAL
REC	➡
PB	⇨

VIDE-V11801 / Druck 18

IO-50 (LINE IN/OUT) PRINTED WIRING BOARD AND SCHEMATIC DIAGRAM

– Ref. No.: IO-50 Board; 4,000 series –

IO-50 BOARD

TO CP-65 BOARD CN904 (UX) (See page 4-45)

TO JK-115 BOARD CN201 (EXCEPT UX) (See page 4-16)

TO MA-181 BOARD CN801 (See page 4-18)

TO MA-181 BOARD CN802 (See page 4-18)

TO MA-181 BOARD CN803 (See page 4-18)

TO CP-65 BOARD CN901 (See page 4-45)

TO CP-65 BOARD CN902 (See page 4-45)

TO SH-11 BOARD CN861 (See page 4-47)

IC701 AUDIO MODE SELECT

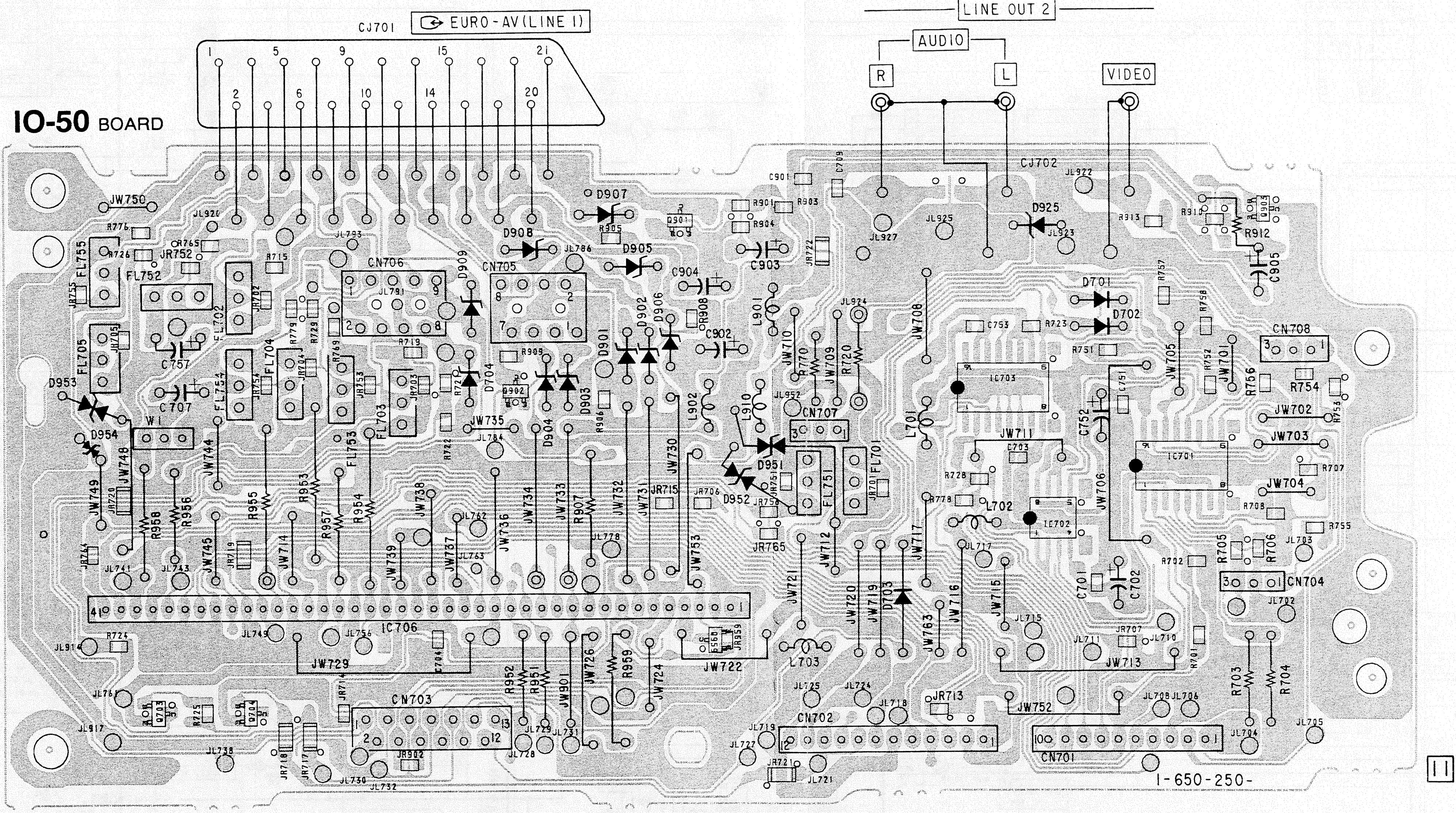
IC702 BUFFER

IC703 NORMAL AU INPUT SWITCH

IC706 C+ SWITCH

Q703, 704 AV CONT SWITCH

IO-50 BOARD



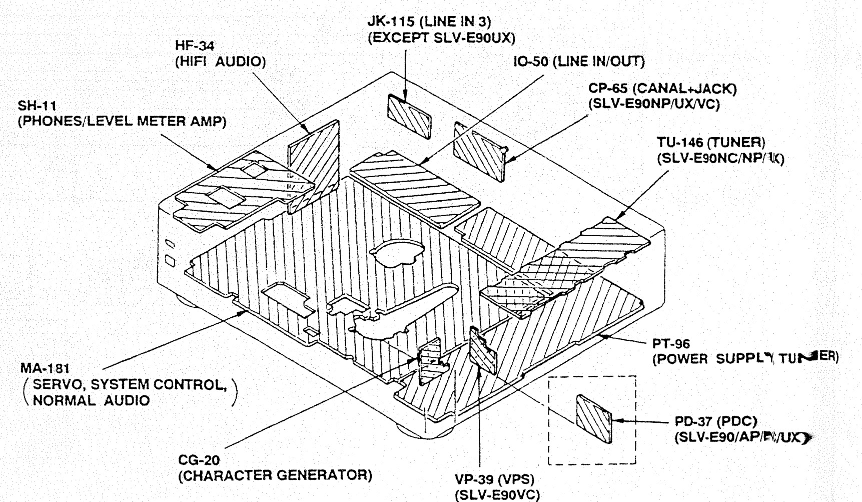
05

- There is no indication for destination in the printed wiring board diagram.

No mark : COMMON (REC)
(   ) : PB

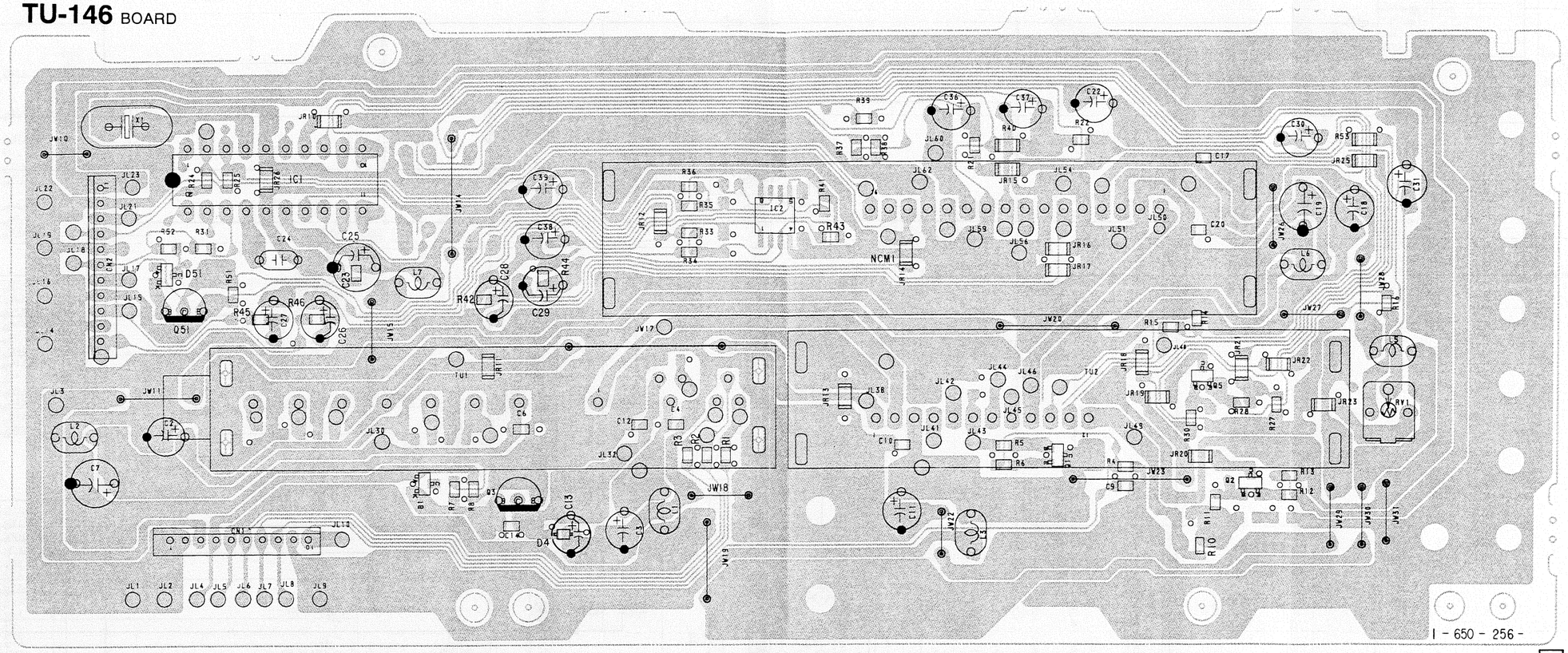
- Signal path

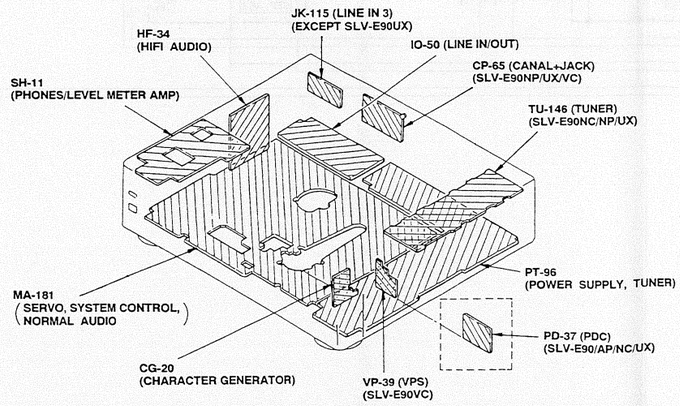
	VIDEO SIGNAL			AUDIO SIGNAL
	CHROMA	Y	Y/CHROMA	
REC	➡	➡»	➡»»	➡
PB	⇨	⇨»	⇨»»	⇨



TU-146 (TUNER) PRINTED WIRING BOARD AND SCHEMATIC DIAGRAM
– Ref. No.: TU-146 Board; 7,000 series –

TU-146 BOARD

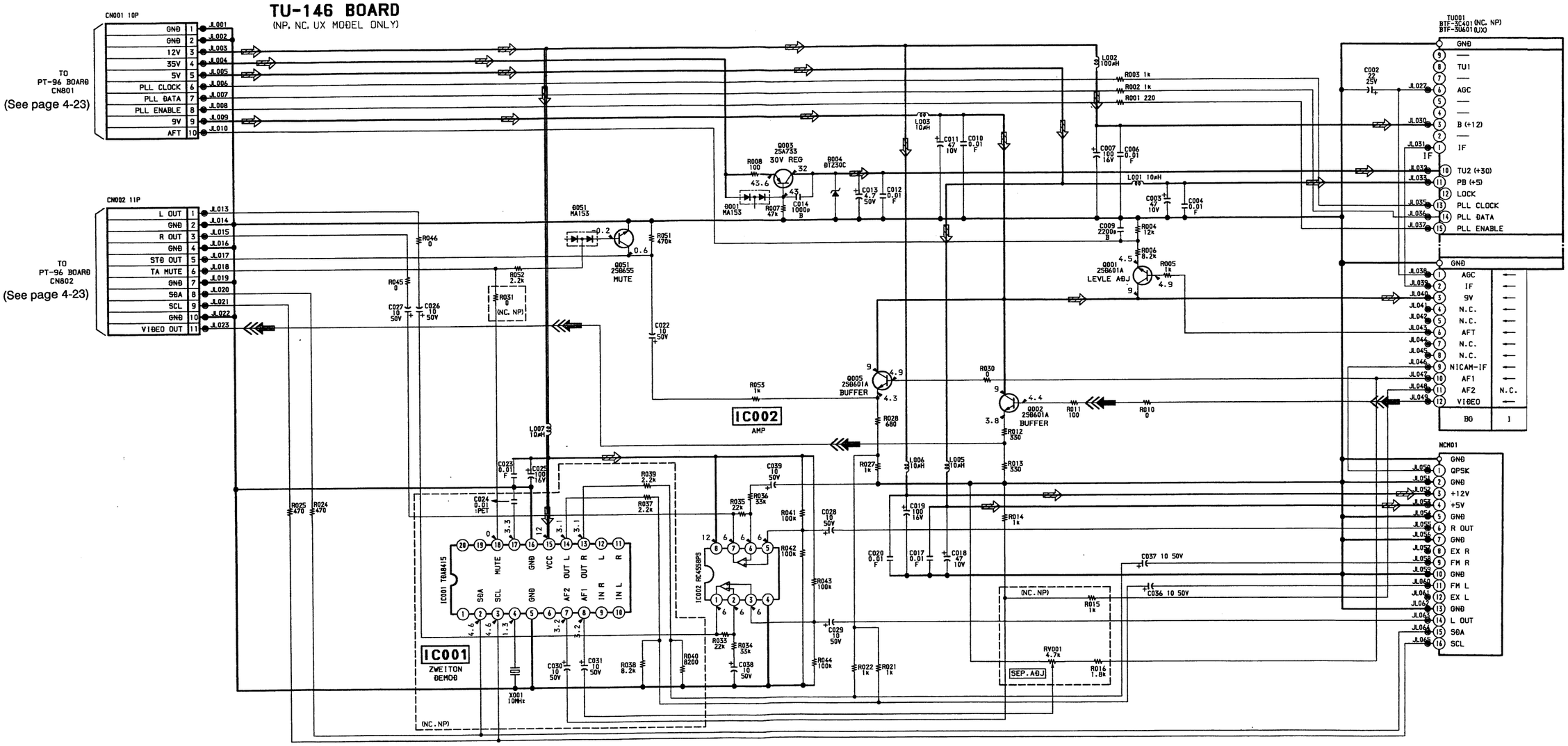




- There is no indication for destination in the printed wiring board diagram.

TU-146 BOARD

(NP, NC, UX MODEL ONLY)



05

- Signal path

	VIDEO SIGNAL		
	CHROMA	Y	Y/CHROMA
REC	➡	➡	➡

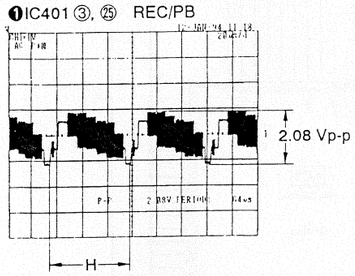
SLV-E90AP/IT/NC/NP/UX/VC

CG-20 (CHARACTER GENERATOR), CP-65 (CANAL + JACK), PD-37 (PDC), VP-39 (VPS) PRINTED WIRING BOARDS AND SCHEMATIC DIAGRAM

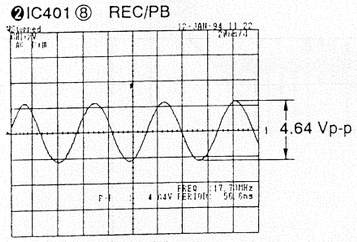
– Ref. No.: CG-20 Board; 4,000 series, CP-65, PD-37 and VP-39 Boards; 9,000 series –

CG-20 BOARD

❶IC401 ③, ㉕ REC/PB

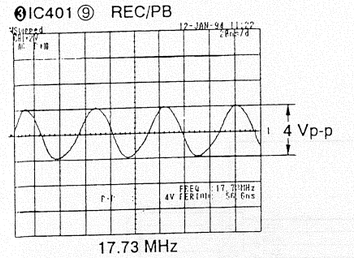


❷IC401 ⑧ REC/PB

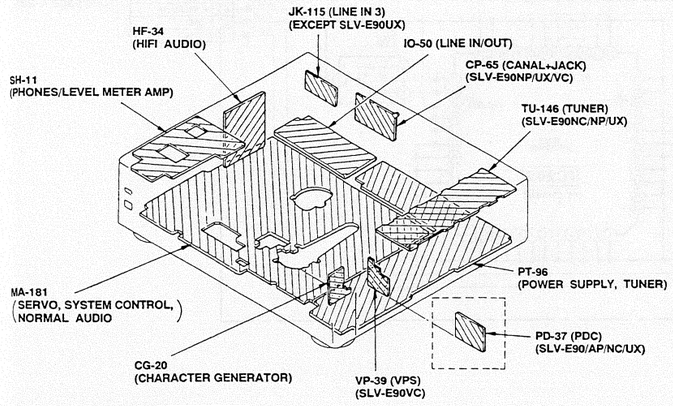


17.73 MHz

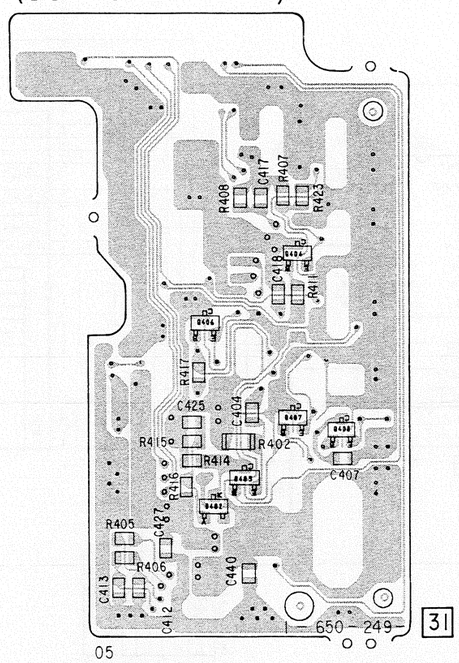
❸IC401 ⑨ REC/PB



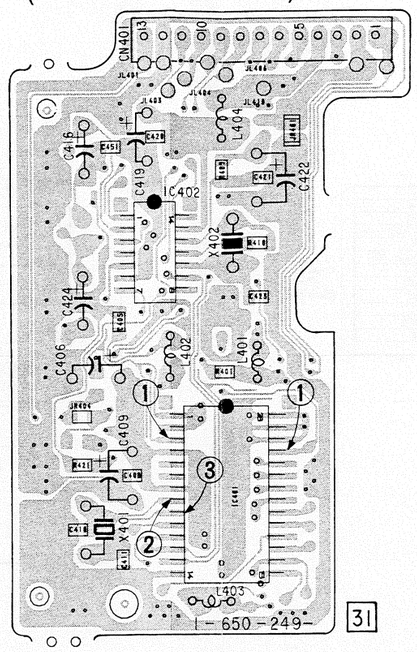
17.73 MHz



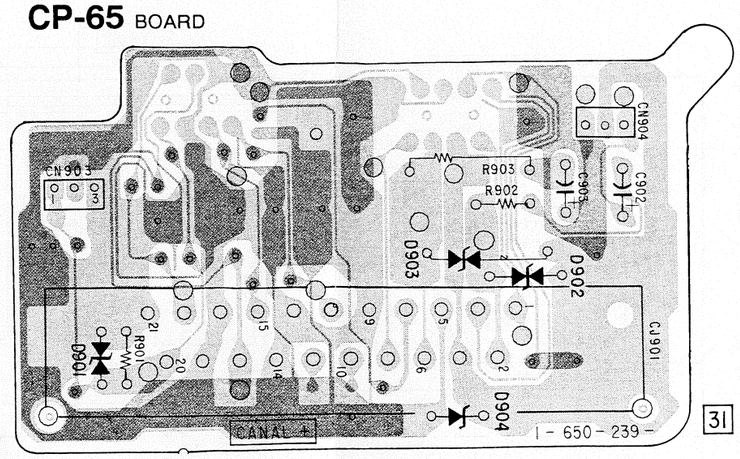
CG-20 BOARD
(COMPONENT SIDE)



CG-20 BOARD
(CONDUCTOR SIDE)

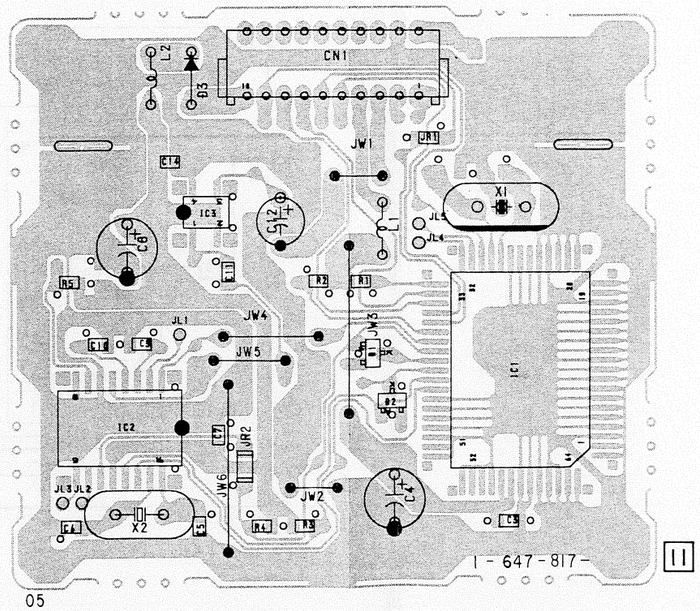


CP-65 BOARD

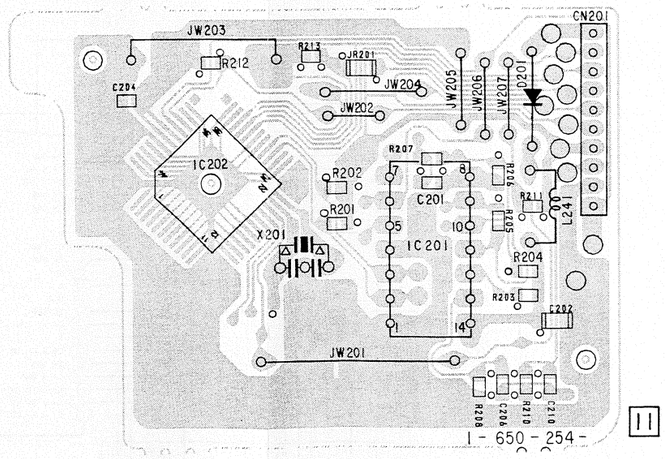


- There is no indication for destination in the printed wiring board diagram.

PD-37 BOARD
SLV-E90UX,NC,AP(BLACK),AP(SILVER)

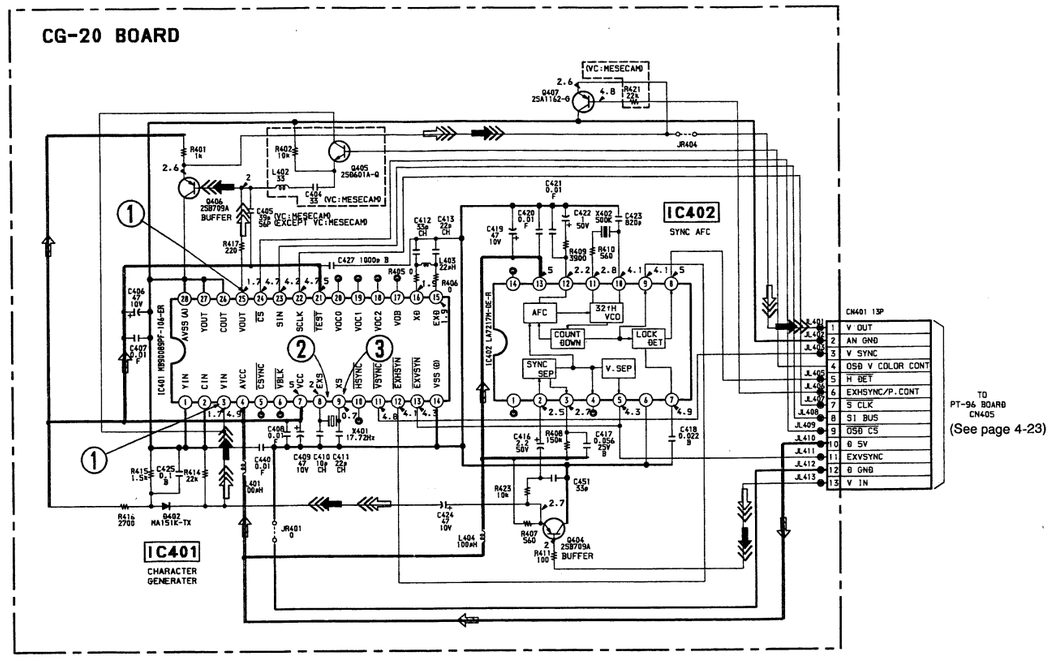


VP-39 BOARD (SLV-E90VC)



PERIPHERY

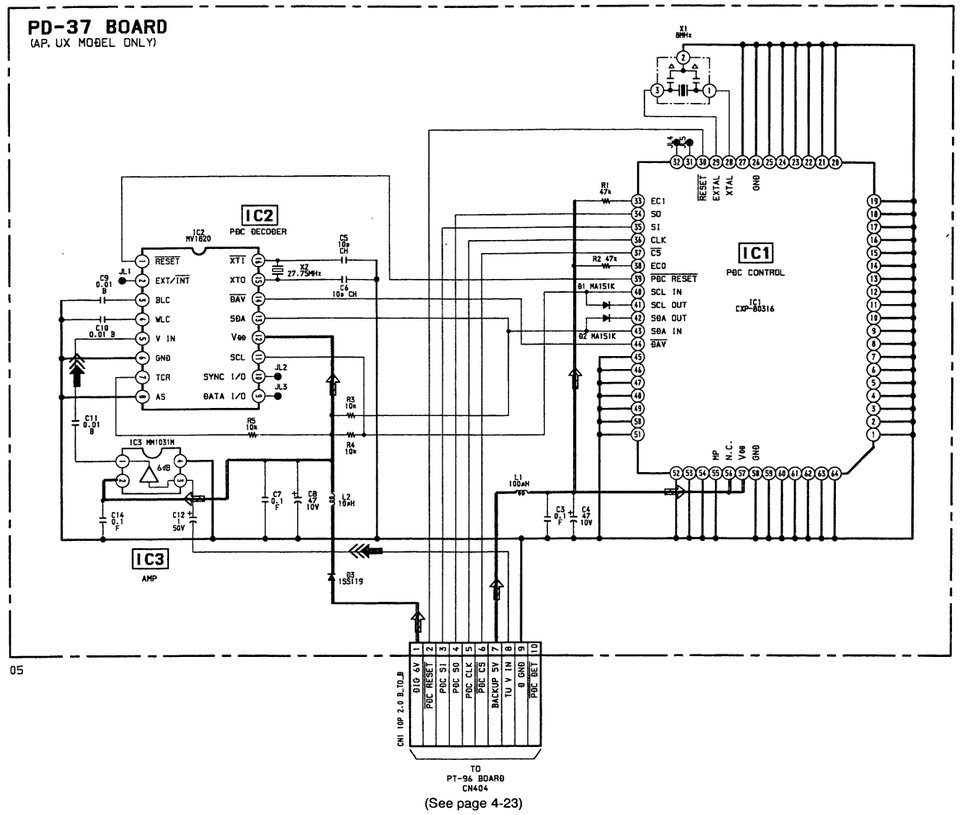
CG-20 BOARD



05

PD-37 BOARD

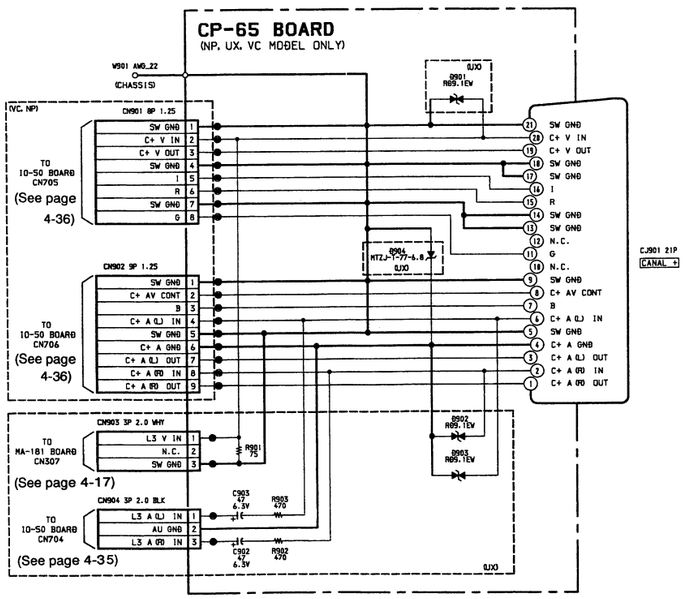
(AP, UX MODEL ONLY)



05

CP-65 BOARD

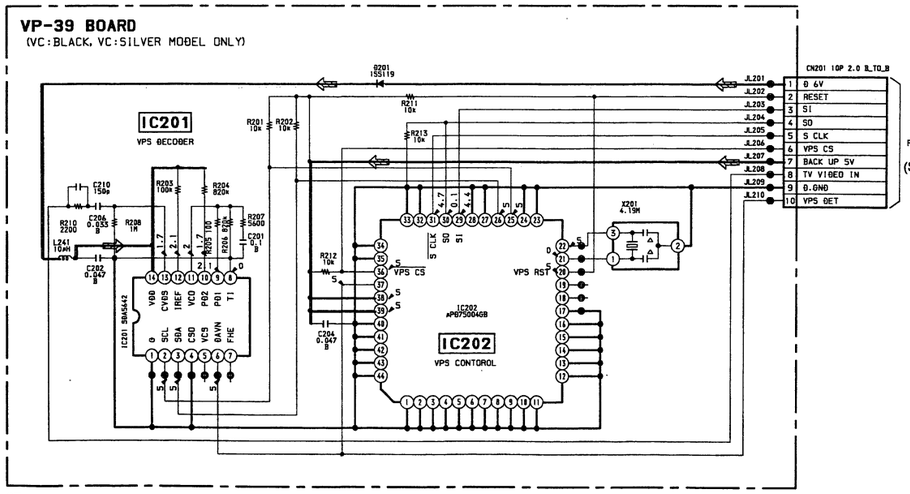
(NP, UX, VC MODEL ONLY)



05

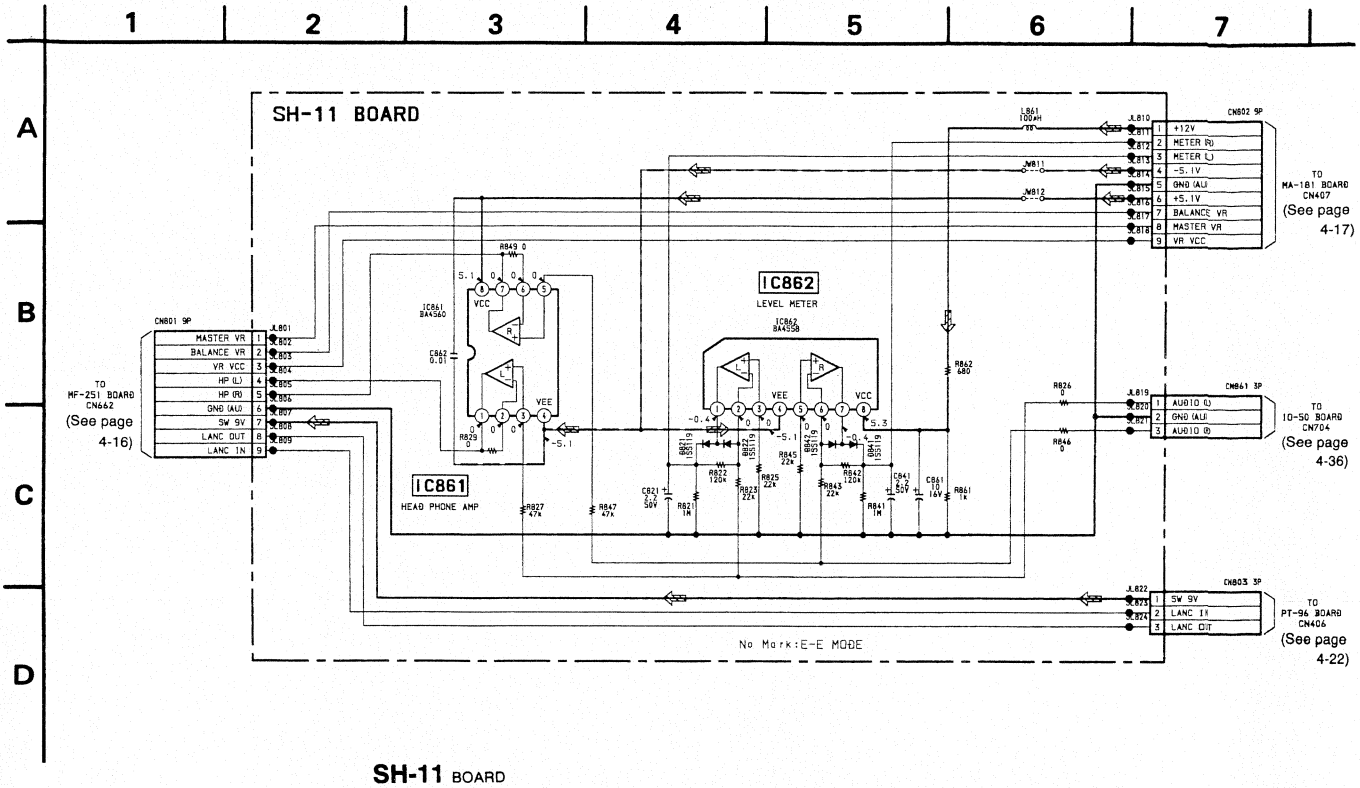
VP-39 BOARD

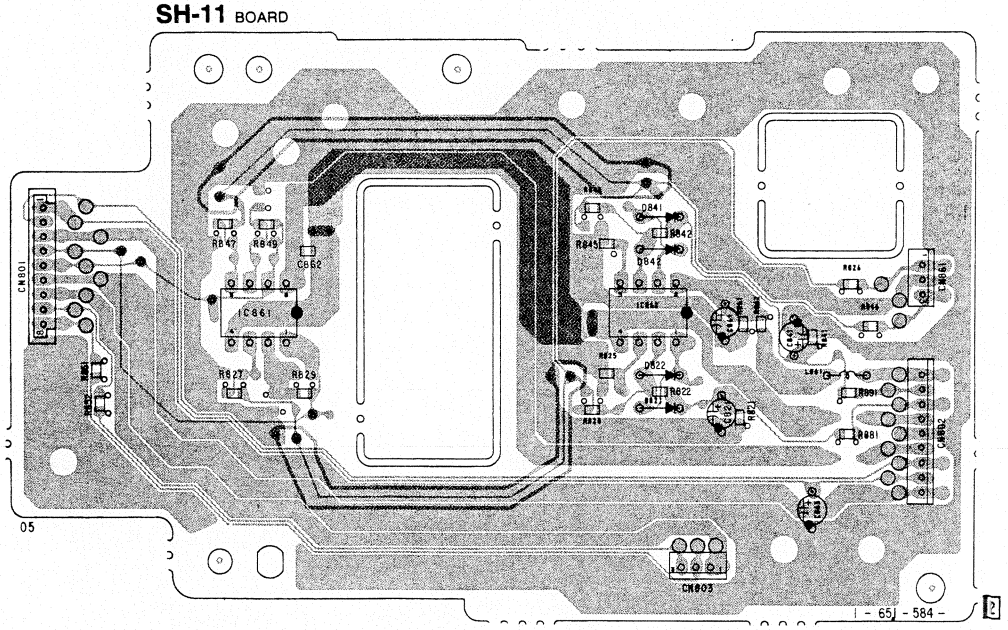
(VC: BLACK, VC: SILVER MODEL ONLY)

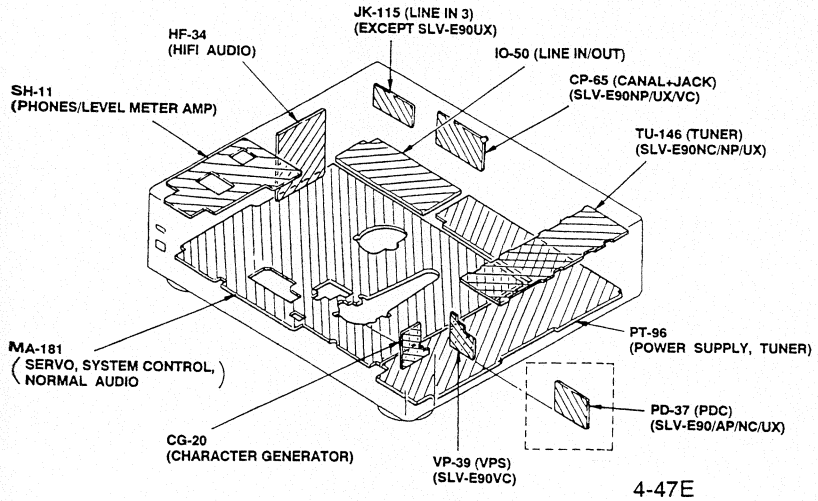


05

SH-11 (PHONES/LEVEL METER AMP) PRINTED WIRING BOARDS AND SCHEMATIC DIAGRAM







SECTION 5
REPAIR PARTS LIST

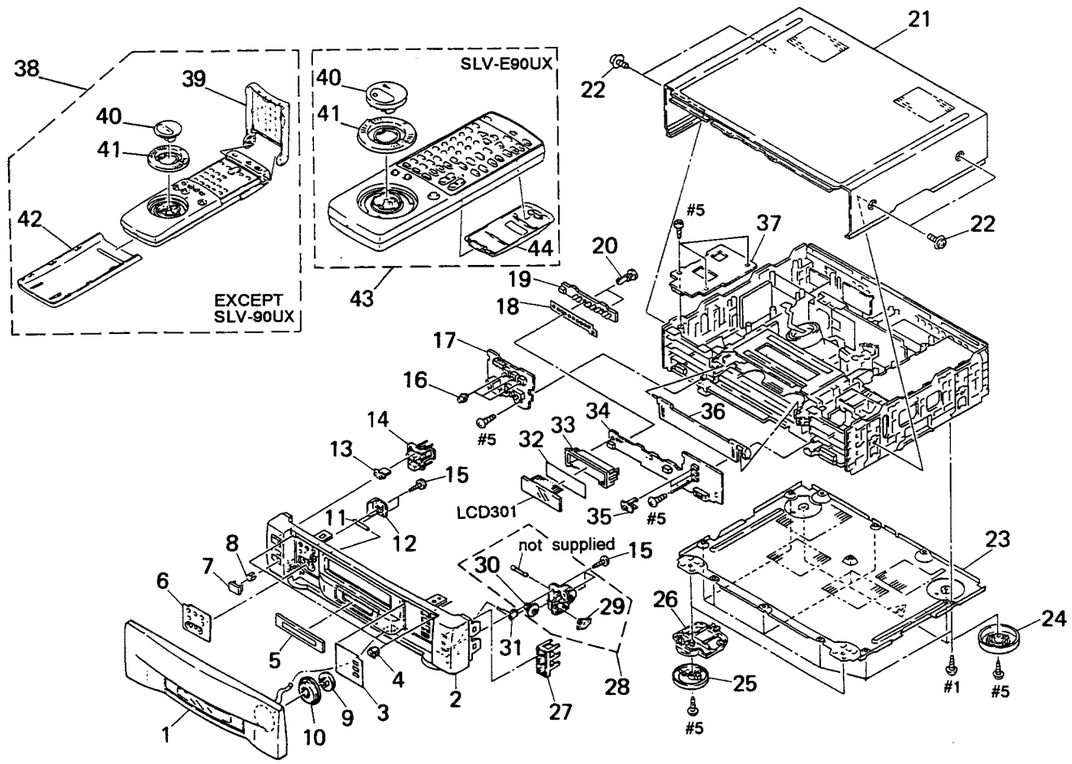
5-1. EXPLODED VIEWS

NOTE:

- -XX and -X mean standardized parts, so they may have some difference from the original one.
- Items marked "*" are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.
- The mechanical parts with no reference number in the exploded views are not supplied.
- Hardware (# mark) list and accessories and packing materials are given in the last of this parts list.

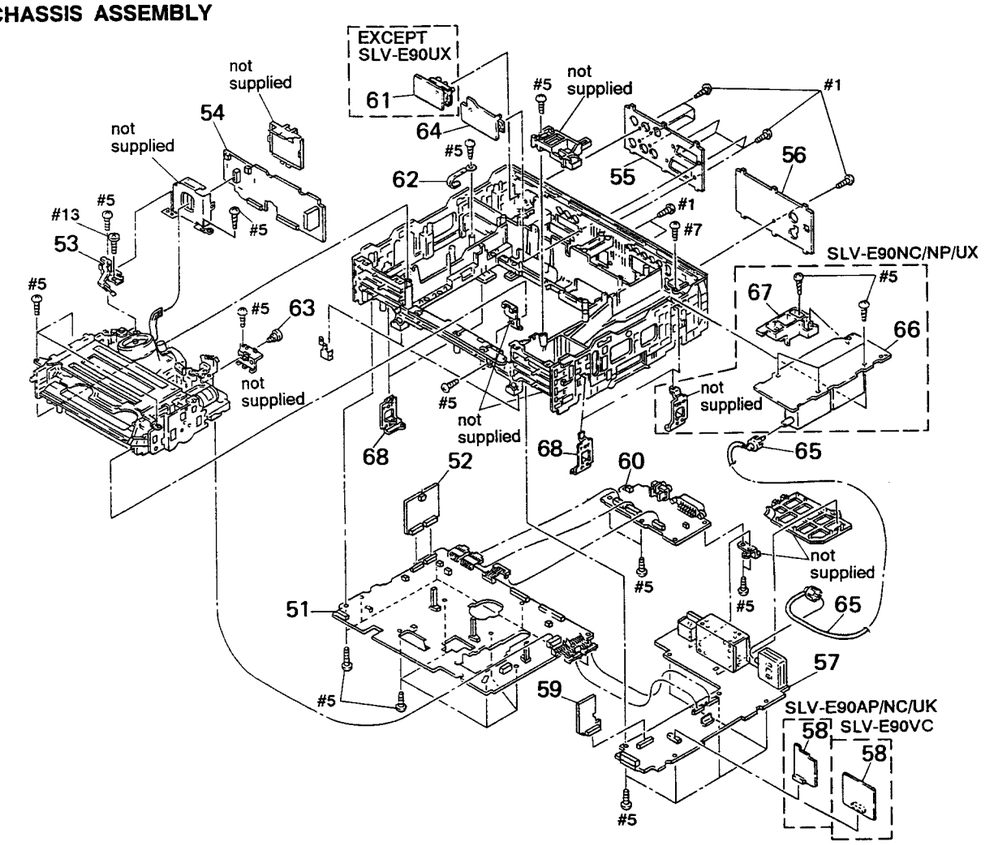
The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety.
Replace only with part number specified.

5-1-1. FRONT PANEL ASSEMBLY AND CABINET



Ref. No.	Part No.	Description	Remark
1	0-771-057-60	SWITCH BLOCK, CONTROL (AP:silver)	
1	0-771-057-70	SWITCH BLOCK, CONTROL (VC:silver)	
1	1-467-584-11	SWITCH BLOCK, CONTROL (UX)	
1	1-467-584-21	SWITCH BLOCK, CONTROL (VC:black/mesecam)	
1	1-467-584-31	SWITCH BLOCK, CONTROL (NP)	
1	1-467-584-41	SWITCH BLOCK, CONTROL (NC)	
1	1-467-584-51	SWITCH BLOCK, CONTROL (AP:black)	
1	1-467-584-61	SWITCH BLOCK, CONTROL (IT)	
2	3-958-026-01	PANEL, FRONT (AP:black/IT/NC/NP/UX/VC:black/mesecam)	
2	3-958-026-11	PANEL, FRONT (AP:silver/VC:silver)	
3	3-958-002-01	PLATE (RIGHT), ORNAMENTAL (P:black/IT/NC/NP/UX/VC:black/mesecam)	
3	3-958-002-11	PLATE (RIGHT), ORNAMENTAL (AP:silver/VC:silver)	
* 4	3-736-779-01	MAGNET	
5	3-958-027-01	PLATE, TRANSPARENT (AP:black/IT/NC/NP/UX/VC:black/mesecam)	
5	3-958-027-11	PLATE, TRANSPARENT (AP:silver/VC:silver)	
6	3-958-001-01	PLATE (LEFT), ORNAMENTAL (AP:black/IT/NC/NP/UX/VC:black/mesecam)	
6	3-958-001-11	PLATE (LEFT), ORNAMENTAL (AP:silver/VC:silver)	
7	3-946-620-01	FILTER, REMOTE CONTROL	
8	3-951-078-11	REFLECTOR, REMOTE CONTROL	
9	X-3943-638-1	BUTTON ASSY, FUNCTION (AP:black/IT/NC/NP/UX/VC:black/mesecam)	
9	X-3944-250-1	BUTTON ASSY, FUNCTION (AP:silver/VC:silver)	
10	3-957-513-11	RING, SHUTTLE (AP:black/IT/NC/NP/UX/VC:black/mesecam)	
10	3-957-513-31	RING, SHUTTLE (AP:silver/VC:silver)	
11	3-958-008-01	SHAFT (LEFT), FULCRUM	
12	3-958-007-01	PLATE (LEFT), FULCRUM, DOOR	
13	3-951-076-11	LENS, POWER	
14	3-958-029-01	BUTTON, POWER/EJECT (AP:black/IT/NC/NP/UX/VC:black/mesecam)	
14	3-958-029-11	BUTTON, POWER/EJECT (AP:silver/VC:silver)	
15	4-921-277-11	SCREW (B2.6X8), TAPPING, BIND	
16	3-958-019-01	KNOB, VR (P:black/IT/NC/NP/UX/VC:black/mesecam)	
16	3-958-019-11	KNOB, VR (AP:silver/VC:silver)	
* 17	A-6721-614-A	MF-251 BOARD, COMPLETE	
* 18	3-958-025-01	SHEET, INSULATING, LCD	
* 19	A-6720-613-A	PL-25 BOARD, COMPLETE	
20	3-957-327-01	RIVET, PUSH	
* 21	3-957-479-11	CASE, UPPER (AP:black/IT/NC/NP/UX/VC:black/mesecam)	
* 21	3-957-479-21	CASE, UPPER (AP:silver/VC:silver)	
22	3-710-901-11	SCREW (TP3X8), CASE	
* 23	3-957-480-01	PLATE, BOTTOM	
24	4-922-526-41	FOOT	
25	3-951-093-01	INSULATOR	
* 26	3-958-010-01	BASE, LEG	
27	3-958-028-01	LENS, FUNCTION	
28	X-3943-757-1	PLATE (RIGHT) ASSY, FULCRUM DOOR	
29	3-712-786-31	DAMPER, OIL	
30	3-953-505-01	GEAR (A), RELAY	
31	X-3943-758-1	SHAFT ASSY, FULCRUM GEAR	
* 32	3-958-021-01	ILLUMINATOR	
* 33	3-958-020-01	HOLDER, LCD	
* 34	A-6721-611-A	MF-250 BOARD, COMPLETE	
35	3-958-012-01	KNOB, SELECTION (AP:black/IT/NC/NP/UX/VC:black/mesecam)	
35	3-958-012-11	KNOB, SELECTION (AP:silver/VC:silver)	
36	3-945-199-71	DOOR, FL (AP:black/IT/NC/NP/UX/VC:black/mesecam)	
36	3-955-525-41	DOOR, FL (AP:silver/VC:silver)	
* 37	A-6781-302-A	SH-11 BOARD, COMPLETE	
38	1-467-385-11	REMOTE COMMANDER (RMT-V142) (NP)	
38	1-467-546-41	REMOTE COMMANDER (RMT-V146C) (AP/IT/NC/VC)	
39	3-708-876-01	COVER (ENGLISH) (AP/IT/NC/NP/VC)	
40	X-3943-638-1	BUTTON ASSY	
41	3-957-513-11	SHUTTLE RING	
42	3-708-816-21	COVER, SLIDE (NP)	
42	3-708-816-31	COVER, SLIDE (AP/IT/NC/VC)	
43	1-467-384-21	REMOTE COMMANDER (RMT-V141) (UX)	
44	3-708-817-01	COVER, BATTERY (UX)	
LCD301	1-810-356-11	DISPLAY PANEL, LIQUID CRYSTAL	

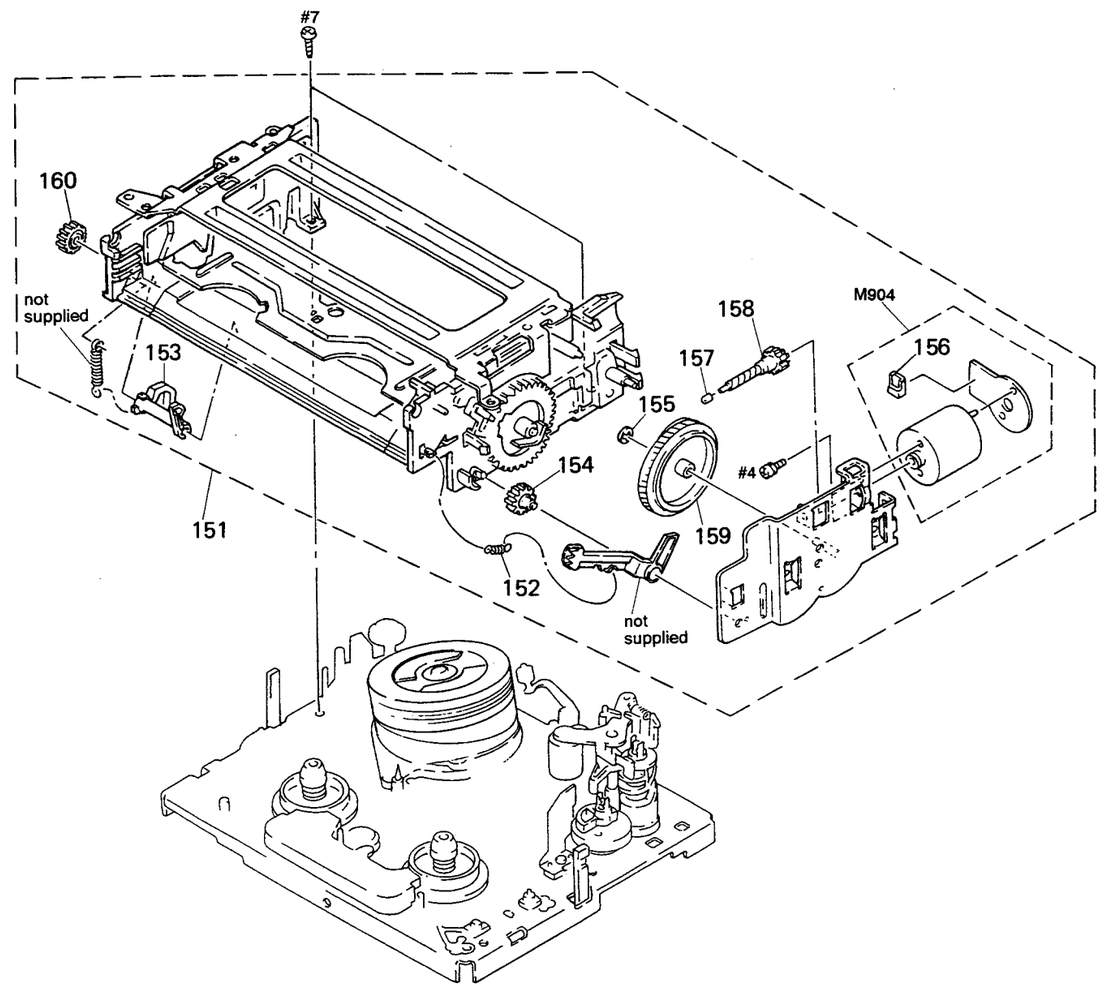
5-1-2. CHASSIS ASSEMBLY



Ref. No.	Part No.	Description	Remark
* 51	A-6782-301-A	MA-181 BOARD, COMPLETE (AP/IT/NC/UX)	
* 51	A-6782-305-A	MA-181 BOARD, COMPLETE (NP/VC:black/silver)	
* 51	A-6782-336-A	MA-181 BOARD, COMPLETE (VC:mesecam)	
* 52	A-6721-595-A	HF-34 BOARD, COMPLETE	
53	X-3943-595-1	GROUND ASSY (GT), SHAFT	
* 54	A-6727-558-A	RV-33 BOARD, COMPLETE (EXCEPT VC:mesecam)	
* 54	A-6727-591-A	RV-33 BOARD, COMPLETE (VC:mesecam)	
* 55	3-957-490-01	PLATE, JACK (IO) (AP:black/silver/IT/NC)	
* 55	3-957-490-21	PLATE, JACK (IO) (NP)	
* 55	3-957-490-31	PLATE, JACK (IO) (UX)	
* 55	3-957-490-41	PLATE, JACK (IO) (VC:black/mesecam/silve)	
* 56	3-957-491-01	PLATE, JACK (TU)	
* 57	A-6727-557-A	PT-96 BOARD, COMPLETE (AP)	
* 57	A-6727-559-A	PT-96 BOARD, COMPLETE (UX)	
* 57	A-6727-560-A	PT-96 BOARD, COMPLETE (NP)	
* 57	A-6727-561-A	PT-96 BOARD, COMPLETE (VC)	
* 57	A-6727-562-A	PT-96 BOARD, COMPLETE (NC)	
* 57	A-6727-563-A	PT-96 BOARD, COMPLETE (IT)	

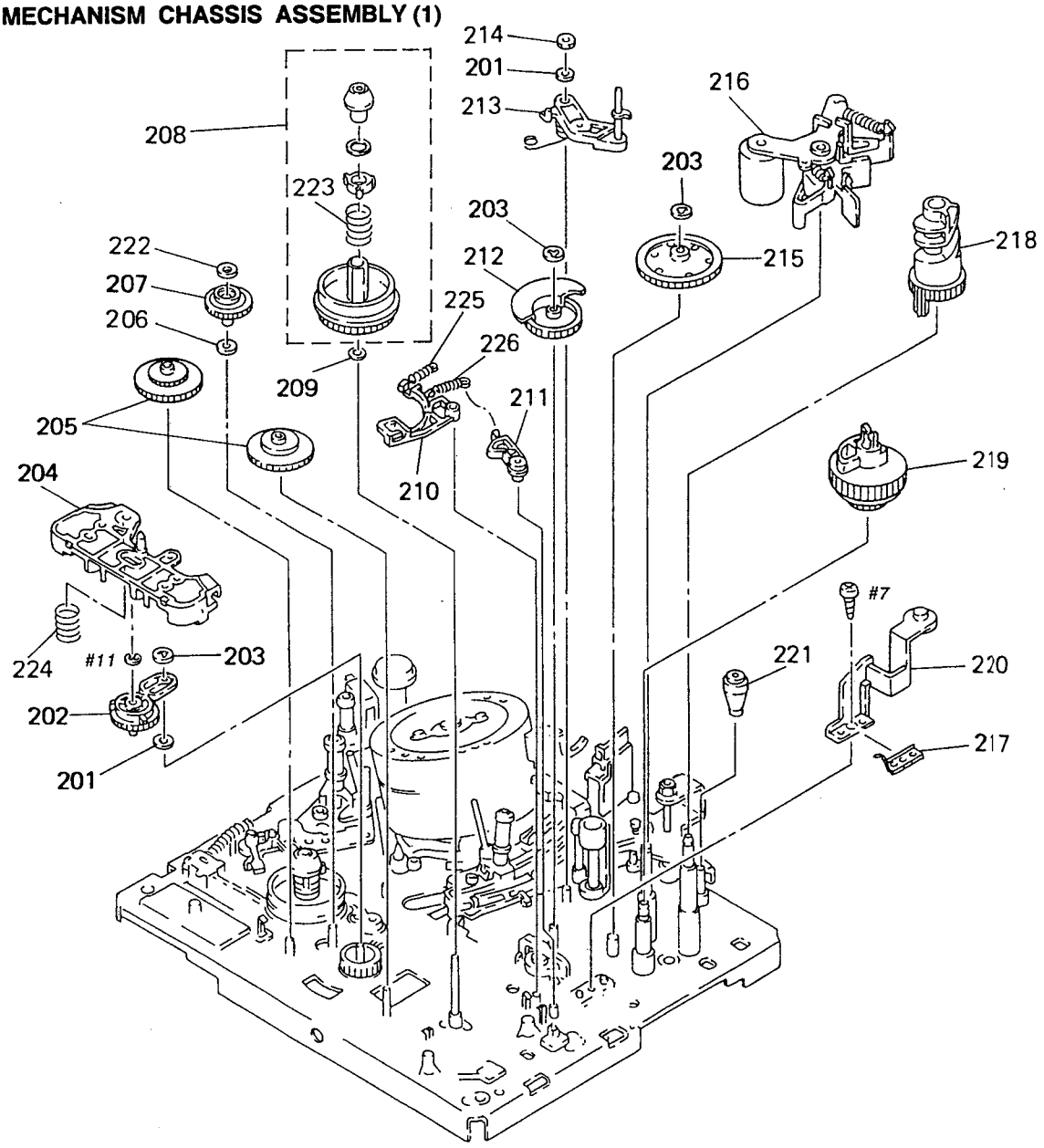
Ref. No.	Part No.	Description	Remark
* 58	A-6781-281-A	VP-39 BOARD, COMPLETE (VC)	
* 58	A-6781-298-A	PD-37 BOARD, COMPLETE (AP/NC/UX)	
* 59	A-6754-660-A	CG-20 BOARD, COMPLETE (VC:mesecam)	
* 59	A-6754-691-A	CG-20 BOARD, COMPLETE (EXCEPT VC:mesecam)	
* 60	A-6754-690-A	IO-50 BOARD, COMPLETE (AP/IT/NC/UX)	
* 60	A-6754-692-A	IO-50 BOARD, COMPLETE (NP)	
* 60	A-6754-693-A	IO-50 BOARD, COMPLETE (VC)	
* 61	A-6781-304-A	JK-115 BOARD, COMPLETE (EXCEPT UX)	
62	3-703-150-11	STOPPER, WIRING	
63	3-736-055-01	SCREW (3X8), TAPPING	
* 64	A-6781-275-A	CP-65 BOARD, COMPLETE (NP/VC)	
* 64	A-6781-282-A	CP-65 BOARD, COMPLETE (UX)	
65	1-555-110-00	CABLE, PIN (NC/NP/UX)	
65	1-558-924-21	CABLE, PIN (AP/IT/VC)	
* 66	A-6754-656-A	TU-146 BOARD, COMPLETE (UX)	
* 66	A-6754-657-A	TU-146 BOARD, COMPLETE (NC/NP)	
67	3-957-546-01	HOLDER (TU), PCB (NC/NP/UX)	
* 68	3-957-387-01	STOPPER (GT), UPPER CASE	

5-1-3. FL CASSETTE COMPARTMENT ASSEMBLY



Ref. No.	Part No.	Description	Remark
151	A-6751-453-A	FL BLOCK ASSY	
152	3-738-285-01	SPRING, TENSION	
153	3-736-163-01	LEVER, ERASING PROTECTION	
154	X-3727-775-2	GEAR (RIGHT) ASSY, MIDWAY	
155	3-696-510-01	WASHER (3), STOPPER	
156	1-564-013-41	PIN, CONNECTOR 3P	
157	3-716-144-02	RETAINER, WORM	
158	3-736-100-01	GEAR (FL), WORM	
159	3-736-164-01	WHEEL (FL), WORM	
160	3-736-044-02	GEAR (LEFT), MIDWAY	
M904	X-3727-784-1	MOTOR ASSY (LOADING)	

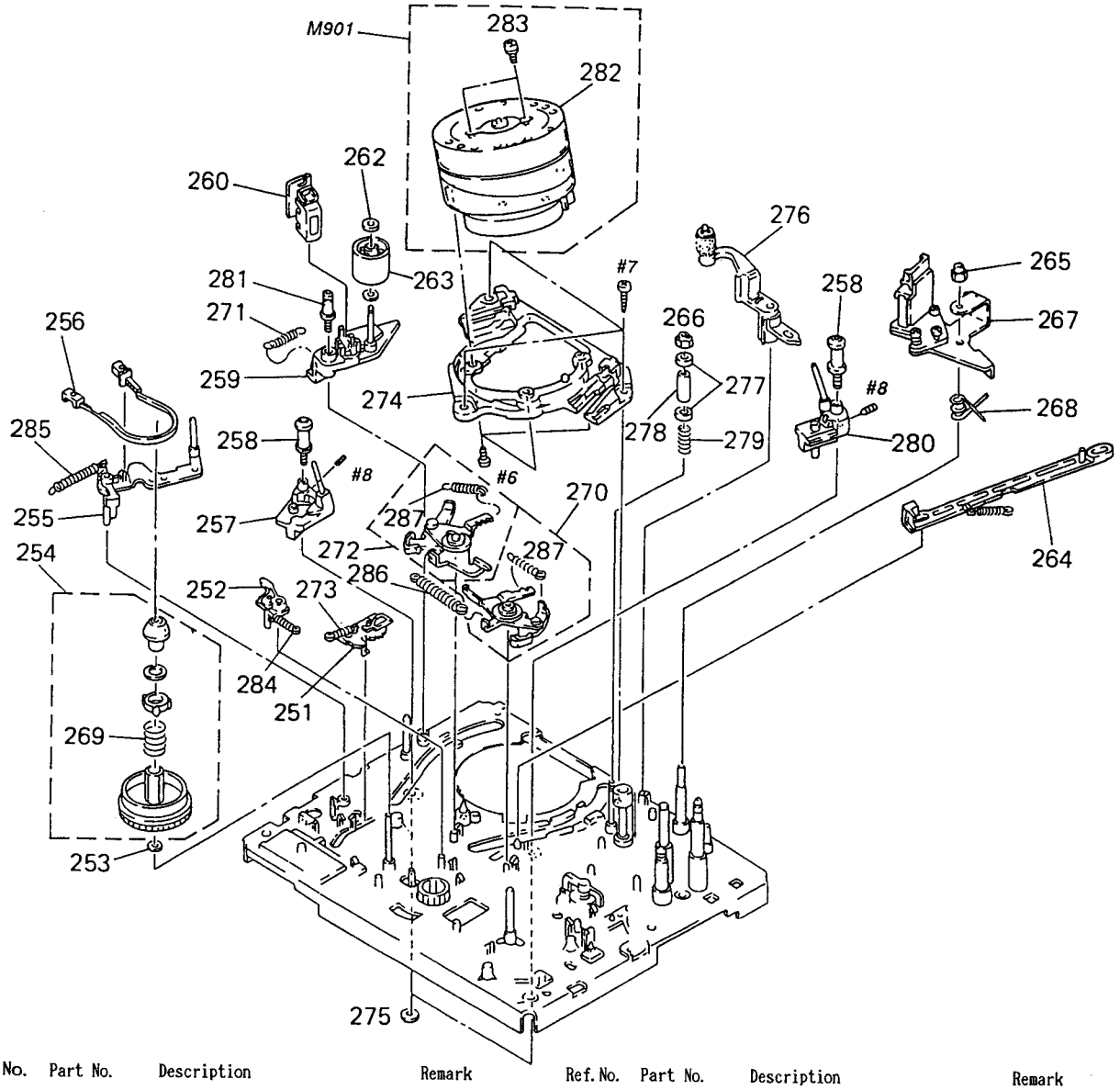
5-1-4. MECHANISM CHASSIS ASSEMBLY (1)



Ref. No.	Part No.	Description	Remark
201	3-701-438-11	WASHER, 2.5	
202	X-3727-776-1	ARM ASSY, PENDULUM	
203	3-669-595-00	WASHER (2), STOPPER	
204	3-736-172-02	RELEASE, LOCK, REEL	
205	X-3727-795-1	GEAR ASSY, RELAY	
206	3-736-074-01	RETAINER (SMALL), THRUST	
207	3-736-037-01	GEAR, REW	
208	X-3727-789-1	TABLE ASSY, REEL	
209	3-738-212-21	RETAINER, THRUST, REEL TABLE	
210	X-3733-335-1	BRAKE ASSY (AT), T SOFT	
211	3-736-105-01	ARM, REV BRAKE	
212	3-736-143-01	GEAR, RVS CAM	
213	X-3942-218-1	ARM ASSY, RVS	

Ref. No.	Part No.	Description	Remark
214	3-736-740-01	NUT (M2X0.25), NYLON	
215	3-736-116-01	GEAR, COMMUNICATION	
216	X-3727-770-1	PINCH ROLLER BLOCK ASSY	
217	3-942-829-01	SPRING (2) (ATOM), GROUND, FL	
218	3-952-182-01	CAM, ELEVATOR	
219	3-943-700-01	GEAR, PRESS CAM	
220	3-942-828-01	OPENNER, LID	
221	3-738-250-01	SCREW, AC ADJUSTMENT	
222	3-736-069-01	RETAINER, SPRING	
223	3-739-621-01	SPRING, COMPRESSION	
224	3-736-020-11	SPRING, COMPRESSION	
225	3-736-024-01	SPRING, TENSION (FOR T SOFT BRAKE)	
226	3-736-025-01	SPRING, TENSION (REW BRAKE)	

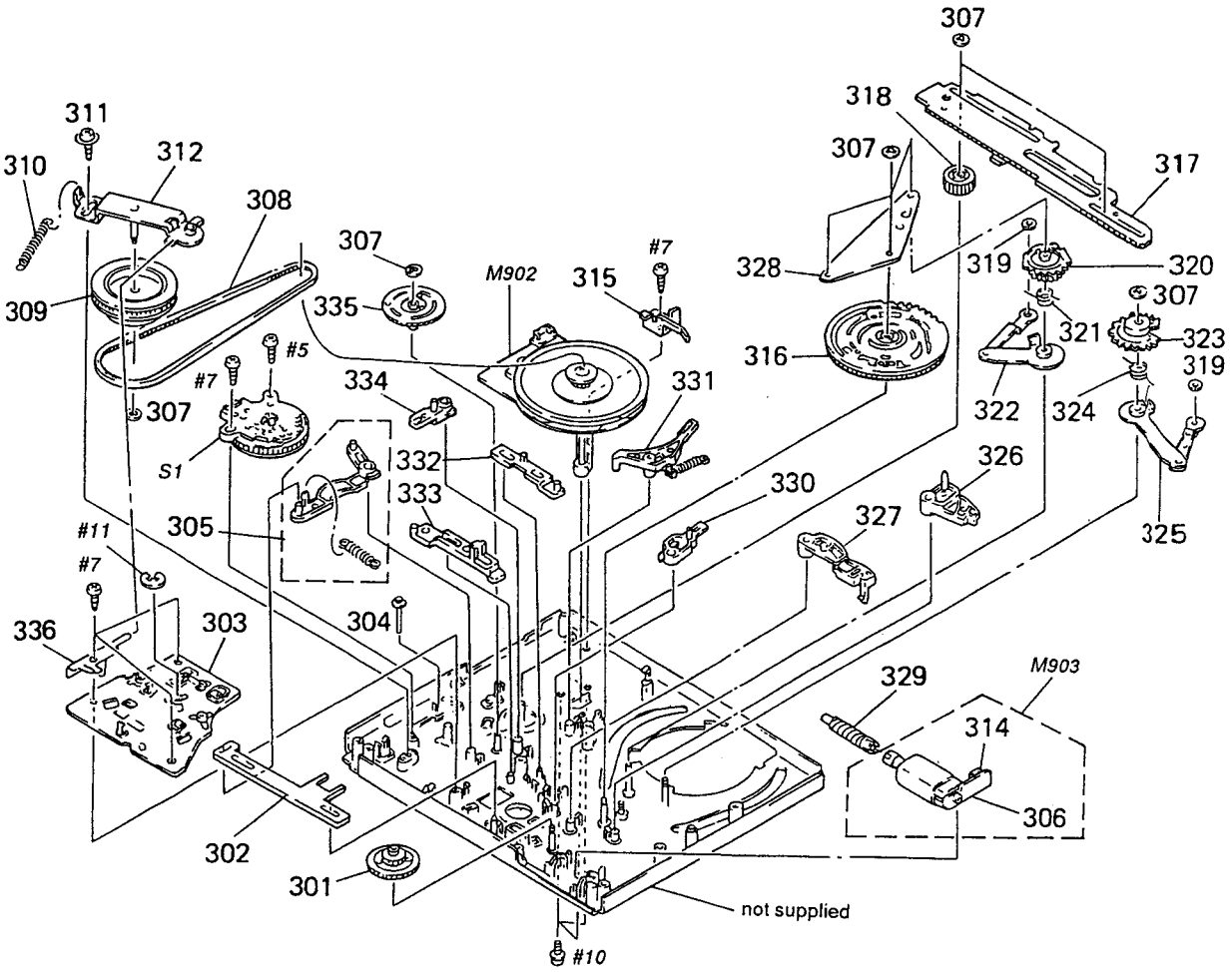
5-1-5. MECHANISM CHASSIS ASSEMBLY (2)



Ref. No.	Part No.	Description	Remark
* 251	A-6759-483-A	TAKE-UP BLOCK ASSY, S	
252	X-3727-773-1	ARM ASSY (S), SOFT BRAKE	
253	3-738-212-21	RETAINER, THRUST, REEL TABLE	
254	X-3941-194-1	TABLE ASSY, REEL, S	
255	X-3727-772-5	ARM ASSY, TENSION REGULATOR	
256	X-3727-797-1	BAND ASSY, TENSION REGULATOR	
257	X-3727-786-1	SHUTTLE (LEFT) ASSY	
258	X-3943-765-1	ROLLER ASSY, GUIDE	
259	X-3942-897-1	BASE ASSY, STABILIZER	
260	1-543-647-11	HEAD, FE	
262	3-741-925-01	RING, RETAINING	
263	3-946-129-01	B STABLIZER	
264	X-3743-517-1	LEVER ASSY, RELEASE, C ROLLER	
265	3-942-867-01	NUT, AC HEIGHT ADJUSTMENT	
266	3-942-866-01	NUT (M3) (3X0.5), NYLON	
267	A-6761-129-A	HEAD BLOCK ASSY, ACE	
268	3-946-148-01	SPRING, TORSION	
269	3-739-621-01	SPRING, COMPRESSION	
270	X-3729-926-1	BRAKE ASSY (2), T	

Ref. No.	Part No.	Description	Remark
271	3-736-745-01	SPRING, TENSION	
272	X-3733-336-2	BRAKE ASSY (2)AT, S	
273	3-738-284-01	SPRING, TENSION	
274	X-3727-791-2	DRUM (BASE) ASSY	
275	3-736-073-01	SLIDER, POLYETHYLENE	
276	A-6747-267-A	ARM BLOCK ASSY (S), C ROLLER	
277	3-736-733-02	FLANGE, 7 GUIDE	
278	3-736-730-01	SLEEVE, #7 GUIDE	
279	3-749-099-01	SPRING (#7 GUIDE), COMPRESSION	
280	X-3727-787-1	SHUTTLE (RIGHT) ASSY	
281	X-3727-788-1	ROLLER ASSY, GUIDE, #2	
282	8-848-623-01	DRUM ASSY, ROTARY UPPER (DZR-67-R)	
283	2-643-205-01	SCREW (PSW3X8)	
284	3-736-047-01	SPRING, TENSION (S SOFT)	
285	3-733-389-01	SPRING, TENSION (TENSION REGULATOR AT)	
286	3-738-221-01	SPRING, TENSION (MAIN BRKE 1)	
287	3-738-220-01	SPRING, TENSION (MAIN BRKE 2)	
M901	8-848-620-11	DRUM ASSY DZH-67A-R	

5-1-6. MECHANISM CHASSIS ASSEMBLY (3)



Ref. No.	Part No.	Description	Remark
301	3-736-015-01	WHEEL (CAM), WORM	
302	3-736-158-01	PLATE, SLIDE, PENDULUM	
303	A-6739-096-A	CHASSIS BLOCK ASSY, SUB	
304	3-736-091-01	PIN, SWITCH	
305	X-3729-924-1	ARM ASSY, PENDULUM FUNCTION	
* 306	1-633-460-11	CA-41 BOARD	
307	3-669-595-00	WASHER (2), STOPPER	
308	3-736-013-01	BELT, TIMING	
309	X-3727-782-1	PULLEY ASSY	
310	3-736-089-01	SPRING, TENSION	
311	3-749-796-11	SCREW, TAPPING +BVTP WASHER	
312	X-3727-761-1	ARM ASSY, ADJUSTMENT	
314	1-564-013-41	PIN, CONNECTOR 3P	
315	3-736-744-01	RETAINER, ROTOR	
316	3-736-176-01	GEAR, CAM	
317	3-736-177-01	PLATE, SLIDE, MODE	
318	3-733-394-01	GEAR, RVS RELAY	
319	3-736-069-01	RETAINER, SPRING	
320	3-736-148-01	GEAR (RIGHT), THREADING	

Ref. No.	Part No.	Description	Remark
321	3-736-092-01	SPRING (RIGHT), TORSION	
322	X-3727-777-1	ARM (RIGHT) ASSY, THREADING	
323	3-736-147-01	GEAR (LEFT), THREADING	
324	3-736-040-01	SPRING (LEFT), TORSION	
325	X-3727-778-1	ARM (LEFT) ASSY, THREADING	
326	3-736-142-01	ARM, TENSION REGULATOR FUNCTION	
327	3-736-140-01	ARM, S TAKE-UP	
328	3-733-396-01	HOLDER, CAM GEAR	
329	3-733-395-01	GEAR (CAM), WORM	
330	3-733-397-01	ARM, BRAKE FUNCTION	
331	X-3733-338-1	BRAKE ASSY(AT), CAP	
332	3-733-398-01	PLATE, SLIDE, BRAKE	
333	3-736-103-01	PLATE, SLIDE, LIMITER	
334	3-736-016-01	ARM, LIMITER FUNCTION	
335	3-736-170-01	GEAR, RKB CAM	
336	3-741-950-01	SPRING PLATE, SC GROUND (AT)	
M902	8-835-489-01	MOTOR, DC U-26K	
M903	X-3733-302-1	MOTOR ASSY, CAM	
S1	1-692-062-11	SWITCH, ROTARY (CAM ENCODER)	

CG-20

5-2. ELECTRICAL PARTS LIST

NOTE:

- Due to standardization, replacements in the parts list may be different from the parts specified in the diagrams or the components used on the set.
- -XX and -X mean standardized parts, so they may have some difference from the original one.
- RESISTORS
  All resistors are in ohms.
  METAL:Metal-film resistor.
  METAL OXIDE: Metal oxide-film resistor.
  F:nonflammable
- Items marked "*" are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.
- SEMICONDUCTORS
  In each case, u:μ, for example:
  uA ..: μA.. uPA..: μPA..
  uPB..: μPB.. uPC..: μPC.. uPD..: μPD..
- CAPACITORS
  uF: μF
- COILS
  uH: μH

The components identified by mark ⚠ or dotted line with mark. ⚠ are critical for safety. Replace only with part number specified.

When indicating parts by reference number, please include the board.

Ref. No.	Part No.	Description			Remark
*	A-6754-660-A	CG-20 BOARD, COMPLETE (VC:mesecam)			
		**********			
*	A-6754-691-A	CG-20 BOARD, COMPLETE (EXCEPT VC:mesecam)			
		**********			
					(Ref. No. 4,000Series)
		< CAPACITOR >			
C404	1-163-105-00	CERAMIC CHIP	33PF	5% 50V	(VC:mesecam)
C405	1-163-107-00	CERAMIC CHIP	39PF	5% 50V	(VC:mesecam)
C405	1-163-245-11	CERAMIC CHIP	56PF	5% 50V	(EXCEPT VC:mesecam)
C406	1-124-126-00	ELECT	47uF	20% 10V	
C407	1-163-031-11	CERAMIC CHIP	0.01uF	50V	
C408	1-163-031-11	CERAMIC CHIP	0.01uF	50V	
C409	1-124-126-00	ELECT	47uF	20% 10V	
C410	1-163-227-11	CERAMIC CHIP	10PF	0.5PF 50V	
C411	1-163-235-11	CERAMIC CHIP	22PF	5% 50V	
C412	1-163-239-11	CERAMIC CHIP	33PF	5% 50V	
C413	1-163-235-11	CERAMIC CHIP	22PF	5% 50V	
C416	1-124-257-00	ELECT	2.2uF	20% 50V	
C417	1-164-343-11	CERAMIC CHIP	0.056uF	10% 25V	
C418	1-163-037-11	CERAMIC CHIP	0.022uF	10% 25V	
C419	1-124-126-00	ELECT	47uF	20% 10V	
C420	1-163-031-11	CERAMIC CHIP	0.01uF	50V	
C421	1-163-031-11	CERAMIC CHIP	0.01uF	50V	
C422	1-126-301-11	ELECT	1uF	20% 50V	
C423	1-163-139-00	CERAMIC CHIP	820PF	5% 50V	
C424	1-124-126-00	ELECT	47uF	20% 10V	
C425	1-164-004-11	CERAMIC CHIP	0.1uF	10% 25V	
C427	1-163-009-11	CERAMIC CHIP	0.001uF	10% 50V	
C440	1-163-031-11	CERAMIC CHIP	0.01uF	50V	
C451	1-163-105-00	CERAMIC CHIP	33PF	5% 50V	
		< CONNECTOR >			
* CN401	1-573-827-11	CONNECTOR, BOARD TO BOARD 13P			
		< DIODE >			
D402	8-719-801-48	DIODE 1SS193			
		< IC >			
IC401	8-759-247-44	IC MB90090PF-107-ER (CHARACTER GENERAT)			
IC402	8-759-164-09	IC LA7218M (SYNC AFC)			
		< JUMPER RESISTOR >			
JR401	1-216-296-91	METAL GLAZE	0	5% 1/8W	
JR404	1-216-295-00	METAL CHIP	0	5% 1/10W	
		< COIL >			
L401	1-408-982-11	INDUCTOR 100uH			
L402	1-408-976-21	INDUCTOR 33uH (VC:mesecam)			
L403	1-408-974-21	INDUCTOR 22uH			
L404	1-408-982-11	INDUCTOR 100uH			
		< TRANSISTOR >			
Q404	8-729-216-22	TRANSISTOR 2SA1162-G			
Q405	8-729-422-27	TRANSISTOR 2SD601A-Q (VC:mesecam)			
Q406	8-729-216-22	TRANSISTOR 2SA1162-G			
Q407	8-729-216-22	TRANSISTOR 2SA1162-G			
Q408	8-729-010-25	TRANSISTOR MSD601-RT1 (VC:mesecam)			
		< RESISTOR >			
R401	1-216-049-00	METAL CHIP	1K	5% 1/10W	
R402	1-216-222-00	METAL GLAZE	10K	5% 1/8W	(VC:mesecam)
R405	1-216-295-00	METAL CHIP	0	5% 1/10W	
R406	1-216-295-00	METAL CHIP	0	5% 1/10W	
R407	1-216-043-00	METAL CHIP	560	5% 1/10W	
R408	1-216-101-00	METAL CHIP	150K	5% 1/10W	
R409	1-216-063-00	METAL CHIP	3.9K	5% 1/10W	
R410	1-216-043-00	METAL CHIP	560	5% 1/10W	
R411	1-216-025-00	METAL CHIP	100	5% 1/10W	
R414	1-216-081-00	METAL CHIP	22K	5% 1/10W	
R415	1-216-053-00	METAL CHIP	1.5K	5% 1/10W	
R416	1-216-059-00	METAL CHIP	2.7K	5% 1/10W	
R417	1-216-033-00	METAL CHIP	220	5% 1/10W	

Ref.No.	Part No.	Description			Remark
R421	1-216-081-00	METAL CHIP	22K	5%	1/10W (VC:mesecam)
R423	1-216-073-00	METAL CHIP	10K	5%	1/10W
		< VIBRATOR >			
X401	1-577-289-11	VIBRATOR, CRYSTAL (17.72MHz)			
X402	1-577-165-11	VIBLATOR, CERAMIC (500KHz)			
**********					
*	A-6781-275-A	CP-65 BOARD, COMPLETE (NP/VC)			
		**********			
*	A-6781-282-A	CP-65 BOARD, COMPLETE (UX)			
		**********			
		(Ref.No. 9,000Series)			
		< CAPACITOR >			
C902	1-126-154-11	ELECT	47uF	20%	6.3V (UX)
C903	1-126-154-11	ELECT	47uF	20%	6.3V (UX)
		< JACK >			
CJ901	1-568-016-11	SOCKET, PIN 21P (CANAL +/EURO-AV(LINE 3) (NP/UK/VC)			
		< CONNECTOR >			
* CN901	1-691-620-21	SOCKET, CONNECTOR 8P (NP/VC)			
* CN902	1-691-621-11	SOCKET, CONNECTOR 9P (NP/VC)			
* CN903	1-564-013-11	PIN, CONNECTOR 3P (UX)			
CN904	1-564-013-21	PIN, CONNECTOR 3P (UX)			
		< DIODE >			
D901	8-719-108-12	DIODE RD9.1E-W (UX)			
D902	8-719-108-12	DIODE RD9.1E-W (UX)			
D903	8-719-108-12	DIODE RD9.1E-W (UX)			
		< RESISTOR >			
R901	1-247-804-11	CARBON	75	5%	1/4W (UX)
R902	1-249-413-11	CARBON	470	5%	1/4W F (UX)
R903	1-249-413-11	CARBON	470	5%	1/4W F (UX)
**********					
*	A-6721-595-A	HF-34 BOARD, COMPLETE			
		**********			
		(Ref.No. 6,000Series)			
		< CAPACITOR >			
C101	1-124-907-11	ELECT	10uF	20%	50V
C102	1-124-907-11	ELECT	10uF	20%	50V
C103	1-124-927-11	ELECT	4.7uF	20%	100V
C104	1-124-927-11	ELECT	4.7uF	20%	100V
C105	1-124-126-00	ELECT	47uF	20%	10V
C106	1-124-126-00	ELECT	47uF	20%	10V
C107	1-124-126-00	ELECT	47uF	20%	10V
C108	1-126-962-11	ELECT	3.3uF	20%	50V
C109	1-126-962-11	ELECT	3.3uF	20%	50V
C110	1-126-962-11	ELECT	3.3uF	20%	50V
C111	1-126-962-11	ELECT	3.3uF	20%	50V
C112	1-126-233-11	ELECT	22uF	20%	50V
C113	1-126-233-11	ELECT	22uF	20%	50V
C114	1-124-252-00	ELECT	0.33uF	20%	50V
C115	1-124-443-00	ELECT	100uF	20%	10V
C116	1-124-443-00	ELECT	100uF	20%	10V
C117	1-104-792-51	ELECT	33uF	20%	16V
C118	1-137-372-11	FILM	0.022uF	5%	50V
C119	1-137-372-11	FILM	0.022uF	5%	50V
C120	1-137-370-11	FILM	0.01uF	5%	50V
C121	1-137-370-11	FILM	0.01uF	5%	50V
C122	1-137-367-11	FILM	0.0033uF	5%	50V
C123	1-137-367-11	FILM	0.0033uF	5%	50V
C124	1-137-364-11	FILM	0.001uF	5%	50V
C125	1-163-006-11	CERAMIC CHIP	560PF	10%	50V
C126	1-163-006-11	CERAMIC CHIP	560PF	10%	50V
C127	1-163-006-11	CERAMIC CHIP	560PF	10%	50V
C128	1-163-006-11	CERAMIC CHIP	560PF	10%	50V
C129	1-163-007-11	CERAMIC CHIP	680PF	10%	50V
C130	1-163-007-11	CERAMIC CHIP	680PF	10%	50V
C131	1-137-372-11	FILM	0.022uF	5%	50V
C132	1-137-372-11	FILM	0.022uF	5%	50V
C133	1-163-145-00	CERAMIC CHIP	0.0015uF	5%	50V
C134	1-163-145-00	CERAMIC CHIP	0.0015uF	5%	50V
C135	1-163-038-00	CERAMIC CHIP	0.1uF		25V
		< CONNECTOR >			
* CN101	1-573-825-11	CONNECTOR, BOARD TO BOARD 11P			
* CN102	1-573-825-11	CONNECTOR, BOARD TO BOARD 11P			
* CN103	1-564-013-11	PIN, CONNECTOR 3P			
		< DIODE >			
D101	8-719-404-46	DIODE MA110			
		< IC >			
IC101	8-759-188-81	IC XLH7776K-VP (AUDIO PROCESSER)			
		< TRANSISTOR >			
⚠Q101	8-729-804-41	TRANSISTOR 2SB1122-S			
⚠Q102	8-729-820-68	TRANSISTOR 2SD1802FA-S			
Q103	8-729-421-19	TRANSISTOR UN2213			
Q104	8-729-421-19	TRANSISTOR UN2213			

The components identified by mark ⚠ or dotted line with mark. ⚠ are critical for safety. Replace only with part number specified.

HF-34 IO-50

Ref. No.	Part No.	Description			Remark
		< RESISTOR >			
R101	1-208-806-11	METAL GLAZE	10K	0.50% 1/10W	
R102	1-208-809-11	METAL GLAZE	13K	0.50% 1/10W	
R103	1-216-083-00	METAL CHIP	27K	5% 1/10W	
R104	1-216-081-00	METAL CHIP	22K	5% 1/10W	
R105	1-216-089-91	METAL GLAZE	47K	5% 1/10W	
R106	1-216-089-91	METAL GLAZE	47K	5% 1/10W	
R107	1-216-083-00	METAL CHIP	27K	5% 1/10W	
R108	1-216-075-00	METAL CHIP	12K	5% 1/10W	
R109	1-216-075-00	METAL CHIP	12K	5% 1/10W	
R110	1-216-057-00	METAL CHIP	2.2K	5% 1/10W	
R111	1-216-105-00	METAL CHIP	220K	5% 1/10W	
R112	1-216-105-00	METAL CHIP	220K	5% 1/10W	
R113	1-216-109-00	METAL CHIP	330K	5% 1/10W	
R114	1-216-069-00	METAL CHIP	6.8K	5% 1/10W	
R115	1-216-069-00	METAL CHIP	6.8K	5% 1/10W	
R116	1-216-077-00	METAL CHIP	15K	5% 1/10W	
R118	1-216-129-00	METAL CHIP	2.2M	5% 1/10W	
R119	1-216-107-00	METAL CHIP	270K	5% 1/10W	
R120	1-216-295-00	METAL CHIP	0	5% 1/10W	
R121	1-216-107-00	METAL CHIP	270K	5% 1/10W	
R123	1-216-295-00	METAL CHIP	0	5% 1/10W	
R124	1-216-066-00	METAL CHIP	5.1K	5% 1/10W	
R125	1-216-049-00	METAL CHIP	1K	5% 1/10W	
R130	1-216-049-00	METAL CHIP	1K	5% 1/10W	
		< VARIABLE RESISTOR >			
RV101	1-241-764-11	RES, ADJ, CERMET 10K			
RV102	1-241-763-11	RES, ADJ, CERMET 4.7K			
RV103	1-241-763-11	RES, ADJ, CERMET 4.7K			

****

* A-6754-690-A IO-50 BOARD, COMPLETE (AP/IT/NC/UX)
****

* A-6754-692-A IO-50 BOARD, COMPLETE (NP)
****

* A-6754-693-A IO-50 BOARD, COMPLETE (VC)
****

(Ref. No. 4,000Series)

Ref. No.	Part No.	Description			Remark
		< CAPACITOR >			
C701	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C702	1-124-126-00	ELECT	47uF	20%	10V
C703	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C704	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C707	1-124-126-00	ELECT	47uF	20%	10V
C709	1-163-009-11	CERAMIC CHIP	0.001uF	10%	50V
C751	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C752	1-124-126-00	ELECT	47uF	20%	10V
C753	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C757	1-124-126-00	ELECT	47uF	20%	10V
C901	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C902	1-124-477-11	ELECT	47uF	20%	25V
C903	1-124-126-00	ELECT	47uF	20%	10V
C904	1-124-472-11	ELECT	470uF	20%	10V
C905	1-124-472-11	ELECT	470uF	20%	10V
		< CONNECTOR >			
CJ701	1-695-935-11	CONNECTOR (SQUARE TYPE) 21P (EURO-AV (LINE 1))			
CJ702	1-565-351-41	JACK, PIN 3P (LINE OUT 2)			
* CN701	1-691-407-11	CONNECTOR, BOARD TO BOARD 10P			
CN702	1-568-672-11	CONNECTOR, BOARD TO BOARD 12P			
* CN703	1-764-212-11	CONNECTOR, BOARD TO BOARD 13P			
CN704	1-506-468-11	PIN, CONNECTOR 3P			
CN705	1-691-908-21	CONNECTOR, WIRE TRAP 8P (NP/VC)			
* CN706	1-695-520-11	CONNECTOR, WIRE TRAP 9P (NP/VC)			
CN707	1-506-468-11	PIN, CONNECTOR 3P			
CN708	1-506-468-11	PIN, CONNECTOR 3P			
		< DIODE >			
D701	8-719-911-19	DIODE	1SS119		
D702	8-719-911-19	DIODE	1SS119		
D703	8-719-911-19	DIODE	1SS119	(NP/VC)	
D704	8-719-921-86	DIODE	MTZJ-13	(NP/VC)	
D901	8-719-109-97	DIODE	RD6.8ES-B2	(NP/VC)	
D902	8-719-109-97	DIODE	RD6.8ES-B2	(NP/VC)	
D903	8-719-109-97	DIODE	RD6.8ES-B2	(NP/VC)	
D904	8-719-109-97	DIODE	RD6.8ES-B2	(NP/UX/VC)	
D905	8-719-109-97	DIODE	RD6.8ES-B2		
D906	8-719-109-97	DIODE	RD6.8ES-B2		
D907	8-719-109-97	DIODE	RD6.8ES-B2		
D908	8-719-109-97	DIODE	RD6.8ES-B2	(NP/VC)	
D909	8-719-921-86	DIODE	MTZJ-13		
D925	8-719-982-09	DIODE	MTZJ-4.3		
D951	8-719-108-12	DIODE	RD9.1E-W		
D952	8-719-108-12	DIODE	RD9.1E-W		
D953	8-719-108-12	DIODE	RD9.1E-W		
D954	8-719-108-12	DIODE	RD9.1E-W		
		< FILTER >			
FL701	1-236-163-11	ENCAPSULATED COMPONENT (VC)			
FL702	1-236-163-11	ENCAPSULATED COMPONENT (VC)			
FL703	1-236-163-11	ENCAPSULATED COMPONENT (VC)			
FL704	1-236-163-11	ENCAPSULATED COMPONENT (VC)			
FL705	1-236-163-11	ENCAPSULATED COMPONENT (VC)			

Ref. No.	Part No.	Description	Remark
FL751	1-236-163-11	ENCAPSULATED COMPONENT (VC)	
FL752	1-236-163-11	ENCAPSULATED COMPONENT (VC)	
FL753	1-236-163-11	ENCAPSULATED COMPONENT (VC)	
FL754	1-236-163-11	ENCAPSULATED COMPONENT (VC)	
FL755	1-236-163-11	ENCAPSULATED COMPONENT (VC)	
		< IC >	
IC701	8-759-009-06	IC MC14052BF (AUDIO MODE SELECT)	
IC702	8-759-924-46	IC BA4560F (BUFFER)	
IC703	8-759-009-06	IC MC14052BF (NORMAL AU INPUT SWITCH)	
IC706	1-809-952-12	IC MODULE, CANAL PLUS BX8179A (C + SWITCH) (NP/VC)	
		< JUMPER RESISTOR >	
JR701	1-216-295-00	METAL CHIP 0 5% 1/10W	(AP/IT/NC/NP/UX)
JR702	1-216-295-00	METAL CHIP 0 5% 1/10W	(AP/IT/NC/NP/UX)
JR703	1-216-295-00	METAL CHIP 0 5% 1/10W (NP)	
JR704	1-216-295-00	METAL CHIP 0 5% 1/10W (NP)	
JR705	1-216-295-00	METAL CHIP 0 5% 1/10W	(AP/IT/NC/NP/UX)
JR706	1-216-295-00	METAL CHIP 0 5% 1/10W(AP/IT/NC/UX)	
JR707	1-216-295-00	METAL CHIP 0 5% 1/10W	
JR713	1-216-295-00	METAL CHIP 0 5% 1/10W(AP/IT/NC/UX)	
JR714	1-216-295-00	METAL CHIP 0 5% 1/10W	
JR715	1-216-295-00	METAL CHIP 0 5% 1/10W (NP/VC)	
JR717	1-216-296-91	METAL GLAZE 0 5% 1/8W (NP/VC)	
JR718	1-216-296-91	METAL GLAZE 0 5% 1/8W	
JR719	1-216-296-91	METAL GLAZE 0 5% 1/8W (NP/VC)	
JR720	1-216-296-91	METAL GLAZE 0 5% 1/8W	
JR721	1-216-296-91	METAL GLAZE 0 5% 1/8W	
JR722	1-216-296-91	METAL GLAZE 0 5% 1/8W	
JR751	1-216-295-00	METAL CHIP 0 5% 1/10W	(AP/IT/NC/NP/UX)
JR752	1-216-295-00	METAL CHIP 0 5% 1/10W	(AP/IT/NC/NP/UX)
JR753	1-216-295-00	METAL CHIP 0 5% 1/10W (NP)	
JR754	1-216-295-00	METAL CHIP 0 5% 1/10W (NP)	
JR755	1-216-295-00	METAL CHIP 0 5% 1/10W	(AP/IT/NC/NP/UX)
JR756	1-216-295-00	METAL CHIP 0 5% 1/10W (AP/IT/NC/UX)	
JR764	1-216-295-00	METAL CHIP 0 5% 1/10W (NP/VC)	
JR765	1-216-295-00	METAL CHIP 0 5% 1/10W (NP/VC)	
JR902	1-216-295-00	METAL CHIP 0 5% 1/10W (AP/IT/NC/UX)	
JR959	1-216-295-00	METAL CHIP 0 5% 1/10W (AP/IT/NC/UX)	
		< COIL >	
L701	1-408-421-00	INDUCTOR 100uH	
L702	1-408-421-00	INDUCTOR 100uH	
L703	1-408-421-00	INDUCTOR 100uH (NP/VC)	
L901	1-408-421-00	INDUCTOR 100uH	
		< TRANSISTOR >	
Q703	8-729-424-56	TRANSISTOR UN211L	
Q704	8-729-421-19	TRANSISTOR UN2213	
Q901	8-729-216-22	TRANSISTOR 2SA1162-G	
Q902	8-729-216-22	TRANSISTOR 2SA1162-G (NP/VC)	
Q903	8-729-216-22	TRANSISTOR 2SA1162-G	
Q959	8-729-422-27	TRANSISTOR 2SD601A-Q (NP/VC)	
		< RESISTOR >	
R701	1-216-081-00	METAL CHIP 22K 5% 1/10W	
R702	1-216-085-00	METAL CHIP 33K 5% 1/10W	
R703	1-249-433-11	CARBON 22K 5% 1/4W	
R704	1-249-435-11	CARBON 33K 5% 1/4W	
R705	1-216-081-00	METAL CHIP 22K 5% 1/10W	
R706	1-216-085-00	METAL CHIP 33K 5% 1/10W	
R707	1-216-081-00	METAL CHIP 22K 5% 1/10W	(AP/IT/NC/UX)
R707	1-216-089-91	METAL GLAZE 47K 5% 1/10W (NP/VC)	
R708	1-216-083-00	METAL CHIP 27K 5% 1/10W	(AP/IT/NC/UX)
R708	1-216-091-00	METAL CHIP 56K 5% 1/10W (NP/VC)	
R715	1-216-041-00	METAL CHIP 470 5% 1/10W	
R719	1-216-041-00	METAL CHIP 470 5% 1/10W (NP/VC)	
R720	1-249-426-11	CARBON 5.6K 5% 1/4W	
R721	1-216-075-00	METAL CHIP 12K 5% 1/10W (NP/VC)	
R722	1-216-075-00	METAL CHIP 12K 5% 1/10W (NP/VC)	
R723	1-216-089-91	METAL GLAZE 47K 5% 1/10W	
R724	1-216-049-00	METAL CHIP 1K 5% 1/10W	
R725	1-216-067-00	METAL CHIP 5.6K 5% 1/10W	
R726	1-216-043-00	METAL CHIP 560 5% 1/10W	
R728	1-216-085-00	METAL CHIP 33K 5% 1/10W	
R729	1-216-043-00	METAL CHIP 560 5% 1/10W (NP/VC)	
R751	1-216-081-00	METAL CHIP 22K 5% 1/10W	
R752	1-216-085-00	METAL CHIP 33K 5% 1/10W	
R753	1-216-081-00	METAL CHIP 22K 5% 1/10W	
R754	1-216-085-00	METAL CHIP 33K 5% 1/10W	
R755	1-216-081-00	METAL CHIP 22K 5% 1/10W	
R756	1-216-085-00	METAL CHIP 33K 5% 1/10W	
R757	1-216-081-00	METAL CHIP 22K 5% 1/10W	(AP/IT/NC/UX)
R757	1-216-089-91	METAL GLAZE 47K 5% 1/10W (NP/VC)	
R758	1-216-083-00	METAL CHIP 27K 5% 1/10W	(AP/IT/NC/UX)
R758	1-216-091-00	METAL CHIP 56K 5% 1/10W (NP/VC)	
R765	1-216-041-00	METAL CHIP 470 5% 1/10W	

IO-50 **JK-115** **MA-181**

Ref. No.	Part No.	Description			Remark
R769	1-216-041-00	METAL CHIP	470	5%	1/10W (NP/VC)
R770	1-249-426-11	CARBON	5.6K	5%	1/4W
R776	1-216-043-00	METAL CHIP	560	5%	1/10W
R778	1-216-085-00	METAL CHIP	33K	5%	1/10W
R779	1-216-043-00	METAL CHIP	560	5%	1/10W (NP/VC)
R901	1-216-037-00	METAL CHIP	330	5%	1/10W
R903	1-249-408-11	CARBON	180	5%	1/4W
R904	1-247-811-31	CARBON	150	5%	1/4W
R905	1-216-021-00	METAL CHIP	68	5%	1/10W
R906	1-216-022-00	METAL CHIP	75	5%	1/10W (NP/VC)
R907	1-249-417-11	CARBON	1K	5%	1/4W (NP/VC)
R908	1-216-022-00	METAL CHIP	75	5%	1/10W
R909	1-216-049-00	METAL CHIP	1K	5%	1/10W (NP/VC)
R910	1-216-037-00	METAL CHIP	330	5%	1/10W
R912	1-216-041-00	METAL CHIP	470	5%	1/10W
R913	1-216-021-00	METAL CHIP	68	5%	1/10W
R951	1-249-417-11	CARBON	1K	5%	1/4W (NP/VC)
R952	1-249-417-11	CARBON	1K	5%	1/4W (NP/VC)
R953	1-247-807-31	CARBON	100	5%	1/4W (NP/VC)
R954	1-247-807-31	CARBON	100	5%	1/4W (NP/VC)
R955	1-247-807-31	CARBON	100	5%	1/4W (NP/VC)
R956	1-247-807-31	CARBON	100	5%	1/4W (NP/VC)
R957	1-247-807-31	CARBON	100	5%	1/4W (NP/VC)
R958	1-247-807-31	CARBON	100	5%	1/4W (NP/VC)
R959	1-247-807-31	CARBON	100	5%	1/4W (NP/VC)

****

* A-6781-304-A JK-115 BOARD, COMPLETE (EXCEPT UX)
****
(Ref. No. 8,000Series)

< CAPACITOR >

C201	1-163-009-11	CERAMIC CHIP	0.001uF	10%	50V (VC)
C202	1-163-009-11	CERAMIC CHIP	0.001uF	10%	50V (VC)

< JACK >

CJ201 1-565-726-11 JACK, PIN 3P (LINE IN 3) (EXCEPT UX)

< CONNECTOR >

CN201 1-506-482-11 PIN, CONNECTOR 3P (EXCEPT UX)
CN202 1-506-482-11 PIN, CONNECTOR 3P (EXCEPT UX)

< DIODE >

D207 8-719-109-93 DIODE RD6.2ES-B2 (EXCEPT UX)

< COIL >

L201 1-414-193-41 INDUCTOR 220uH(VC)
L202 1-414-193-41 INDUCTOR 220uH(VC)

Ref. No.	Part No.	Description			Remark

< RESISTOR >

R201	1-216-041-00	METAL CHIP	470	5%	1/10W (EXCEP
R202	1-216-041-00	METAL CHIP	470	5%	1/10W (EXCEP
R203	1-216-022-00	METAL CHIP	75	5%	1/10W (EXCEP

****

* A-6782-301-A MA-181 BOARD, COMPLETE (AP/IT/NC/UX)
****

* A-6782-305-A MA-181 BOARD, COMPLETE (NP/VC:black/silver)
****

* A-6782-336-A MA-181 BOARD, COMPLETE (VC:mesecam)
****
(Ref. No. 2,000Series)

< CAPACITOR >

C001	1-161-494-00	CERAMIC	0.022uF		25V
C002	1-161-494-00	CERAMIC	0.022uF		25V
C003	1-124-261-00	ELECT	10uF	20%	50V
C004	1-162-306-11	CERAMIC	0.01uF	20%	16V
C006	1-124-589-11	ELECT	47uF	20%	16V
C008	1-164-159-11	CERAMIC	0.1uF		50V
C009	1-164-159-11	CERAMIC	0.1uF		50V
C022	1-162-306-11	CERAMIC	0.01uF	20%	16V
C025	1-162-294-31	CERAMIC	0.001uF	10%	50V
C026	1-162-294-31	CERAMIC	0.001uF	10%	50V
C101	1-162-306-11	CERAMIC	0.01uF	20%	16V
C102	1-124-126-00	ELECT	47uF	20%	10V
C103	1-162-849-11	CERAMIC	0.068uF	10%	16V
C104	1-126-233-11	ELECT	22uF	20%	50V
C105	1-124-443-00	ELECT	100uF	20%	10V
C106	1-162-294-31	CERAMIC	0.001uF	10%	50V
C107	1-162-835-11	CERAMIC	0.0047uF	10%	16V
C108	1-164-159-11	CERAMIC	0.1uF		50V
C109	1-124-925-11	ELECT	2.2uF	20%	100V
C110	1-124-477-11	ELECT	47uF	20%	25V
C201	1-162-306-11	CERAMIC	0.01uF	20%	16V
C202	1-124-589-11	ELECT	47uF	20%	16V
C203	1-126-101-11	ELECT	100uF	20%	16V
C204	1-137-374-11	FILM	0.047uF	5%	50V (EXCEPT VC:mesecam)
C204	1-137-399-11	FILM	0.1uF	5%	50V (VC:mesecam)
C205	1-162-306-11	CERAMIC	0.01uF	20%	16V
C206	1-126-233-11	ELECT	22uF	20%	50V
C207	1-137-372-11	FILM	0.022uF	5%	50V
C208	1-124-257-00	ELECT	2.2uF	20%	50V
C210	1-126-176-11	ELECT	220uF	20%	10V
C211	1-162-205-31	CERAMIC	18PF	5%	50V

Ref. No.	Part No.	Description			Remark
C212	1-162-205-31	CERAMIC	18PF	5%	50V
C213	1-164-159-11	CERAMIC	0.1uF		50V
C214	1-162-294-31	CERAMIC	0.001uF	10%	50V
C215	1-161-057-00	CERAMIC	0.033uF	10%	50V
C216	1-164-159-11	CERAMIC	0.1uF		50V
C299	1-162-282-31	CERAMIC	100PF	10%	50V
			(EXCEPT VC:mesecam)		
C351	1-124-907-11	ELECT	10uF	20%	50V
C352	1-124-907-11	ELECT	10uF	20%	50V
C353	1-124-261-00	ELECT	10uF	20%	50V
C354	1-164-159-11	CERAMIC	0.1uF		50V
C355	1-124-261-00	ELECT	10uF	20%	50V
C356	1-124-261-00	ELECT	10uF	20%	50V
C361	1-162-282-31	CERAMIC	100PF	10%	50V
C362	1-162-282-31	CERAMIC	100PF	10%	50V
C364	1-162-306-11	CERAMIC	0.01uF	20%	16V
C366	1-162-282-31	CERAMIC	100PF	10%	50V
C398	1-162-282-31	CERAMIC	100PF	10%	50V (NP/VC)
C399	1-162-282-31	CERAMIC	100PF	10%	50V (NP/VC)
C401	1-164-084-11	CERAMIC	820PF	10%	50V
C402	1-164-092-11	CERAMIC	0.0033uF	10%	25V
C403	1-124-902-00	ELECT	0.47uF	20%	50V
C404	1-124-907-11	ELECT	10uF	20%	50V
C405	1-137-370-11	FILM	0.01uF	5%	50V
C406	1-164-159-11	CERAMIC	0.1uF		50V
C407	1-124-903-11	ELECT	1uF	20%	50V
C409	1-164-159-11	CERAMIC	0.1uF		50V
C410	1-124-907-11	ELECT	10uF	20%	50V
C411	1-124-252-00	ELECT	0.33uF	20%	50V
C414	1-130-488-00	MYLAR	0.027uF	5%	50V
C415	1-124-903-11	ELECT	1uF	20%	50V
C416	1-130-486-00	MYLAR	0.018uF	10%	50V
C417	1-104-792-51	ELECT	33uF	20%	16V
C418	1-104-792-51	ELECT	33uF	20%	16V
C421	1-162-290-31	CERAMIC	470PF	10%	50V
C852	1-162-306-11	CERAMIC	0.01uF	20%	16V
C853	1-162-306-11	CERAMIC	0.01uF	20%	16V
C854	1-164-087-11	CERAMIC	0.0015uF	10%	50V
C855	1-164-087-11	CERAMIC	0.0015uF	10%	50V
C856	1-137-612-11	FILM	0.0068uF	5%	100V
C857	1-104-697-11	FILM	0.047uF	5%	100V
C858	1-104-695-11	FILM	330PF	5%	100V
C859	1-126-101-11	ELECT	100uF	20%	16V
C860	1-126-101-11	ELECT	100uF	20%	16V

< CONNECTOR >

CN002	1-569-335-11	CONNECTOR, BOARD TO BOARD 9P	
CN003	1-691-643-11	CONNECTOR, BOARD TO BOARD	
CN005	1-506-468-11	PIN, CONNECTOR 3P	
CN006	1-569-333-11	CONNECTOR, BOARD TO BOARD 3P	
CN101	1-506-468-11	PIN, CONNECTOR 3P	
* CN201	1-573-128-11	PIN, CONNECTOR 5P	
CN301	1-569-341-11	CONNECTOR, BOARD TO BOARD 19P	
CN302	1-569-341-11	CONNECTOR, BOARD TO BOARD 19P	
CN303	1-573-846-11	CONNECTOR, BOARD TO BOARD 14P	
CN304	1-573-852-11	CONNECTOR, BOARD TO BOARD 20P	
* CN307	1-560-891-00	PIN, CONNECTOR 3P	
CN402	1-695-821-11	CONNECTOR, BOARD TO BOARD 12P	
* CN405	1-573-843-11	CONNECTOR, BOARD TO BOARD 11P	
* CN406	1-573-843-11	CONNECTOR, BOARD TO BOARD 11P	
* CN407	1-568-936-11	PIN, CONNECTOR 9P	
* CN801	1-691-409-11	CONNECTOR, BOARD TO BOARD 10P	
* CN802	1-764-210-11	CONNECTOR, BOARD TO BOARD 12P	
* CN803	1-764-211-11	CONNECTOR, BOARD TO BOARD 13P	
CN854	1-506-469-11	PIN, CONNECTOR 4P	
CN855	1-506-468-11	PIN, CONNECTOR 3P	
* CN857	1-560-891-00	PIN, CONNECTOR 3P	

< DIODE >

D001	8-719-985-00	DIODE	GL451VS1
D004	8-719-109-93	DIODE	RD6.2ES-B2
D005	8-719-109-93	DIODE	RD6.2ES-B2
D006	8-719-109-93	DIODE	RD6.2ES-B2
D007	8-719-109-93	DIODE	RD6.2ES-B2
D201	8-719-911-19	DIODE	1SS119
D202	8-719-109-74	DIODE	RD4.3ES-B1
D203	8-719-109-81	DIODE	RD4.7ES-B2
D204	8-719-200-82	DIODE	11ES2
D206	8-719-911-19	DIODE	1SS119
D351	8-719-911-19	DIODE	1SS119
D352	8-719-911-19	DIODE	1SS119
D353	8-719-911-19	DIODE	1SS119
D401	8-719-911-19	DIODE	1SS119
D402	1-249-417-11	CARBON	1K 5% 1/4W F (EXCEPT VC:mesecam)
D403	8-719-911-19	DIODE	1SS119

< IC >

IC002	8-759-912-77	IC	uPC324C (WAVE SHAPER)
IC101	8-759-246-14	IC	TA8823N (REC/PB CONTROL)
⚠IC201	8-759-983-45	IC	BA6238A (CAM/LOAD MOTOR DRIVE)
IC202	8-759-503-91	IC	TL082ACP (CAP/DRUM ERROR INTEGRATOR)
IC203	8-752-848-84	IC	CXP80732-013Q (SERVO SYSTEM CONTROL)
IC303	8-759-198-39	IC	HD49783 (SYNCHRO SERIAL BUS)
IC305	8-759-927-56	IC	BA7021 (VIDEO SWITCH)
IC306	8-759-710-40	IC	NJM2234D (VIDEO SWITCH)

The components identified by mark ⚠ or dotted line with mark. ⚠ are critical for safety. Replace only with part number specified.

MA-181

Ref. No.	Part No.	Description	Remark
IC401	8-759-089-82	IC BA7790LS (REC/PB AMP/SWITCH)	
		< COIL >	
L101	1-414-189-31	INDUCTOR 100uH	
L201	1-414-185-41	INDUCTOR 22uH	
L202	1-414-183-41	INDUCTOR 10uH	
L351	1-410-509-11	INDUCTOR 10uH	
L352	1-410-509-11	INDUCTOR 10uH	
L401	1-410-071-11	INDUCTOR 10mH	
L402	1-414-183-41	INDUCTOR 10uH	
L852	1-410-687-11	INDUCTOR 1.2mH	
L853	1-410-687-11	INDUCTOR 1.2mH	
		< PHOTO INTERRUPTER >	
PH001	8-759-144-33	IC PS6002	
PH002	8-759-144-33	IC PS6002	
		< IC LINK >	
⚠PS201	1-532-685-00	LINK, IC	
⚠PS851	1-532-679-00	LINK, IC	
		< TRANSISTOR >	
Q001	8-729-926-31	TRANSISTOR PT483F1S	
Q002	8-729-926-31	TRANSISTOR PT483F1S	
Q201	8-729-422-71	TRANSISTOR UN411L	
Q301	8-729-900-89	TRANSISTOR DTC144ES (VC:mesecam)	
Q302	8-729-900-65	TRANSISTOR DTA144ES	
Q306	8-729-900-65	TRANSISTOR DTA144ES	
Q851	8-729-012-31	TRANSISTOR 2SC4040-TL2-Q	
Q852	8-729-012-31	TRANSISTOR 2SC4040-TL2-Q	
Q853	8-729-119-78	TRANSISTOR 2SC2785-HFE	
⚠Q854	8-729-422-57	TRANSISTOR UN4111	
Q855	8-729-900-65	TRANSISTOR DTA144ES	
		< RESISTOR >	
R001	1-249-423-11	CARBON 3.3K 5% 1/4W F	
R002	1-249-423-11	CARBON 3.3K 5% 1/4W F	
R003	1-249-426-11	CARBON 5.6K 5% 1/4W	
R004	1-249-426-11	CARBON 5.6K 5% 1/4W	
R005	1-249-415-11	CARBON 680 5% 1/4W F	
R006	1-249-441-11	CARBON 100K 5% 1/4W	
R007	1-249-441-11	CARBON 100K 5% 1/4W	
R008	1-249-425-11	CARBON 4.7K 5% 1/4W F	
R009	1-249-408-11	CARBON 180 5% 1/4W F	
R010	1-249-422-11	CARBON 2.7K 5% 1/4W F	
R011	1-249-437-11	CARBON 47K 5% 1/4W	
R012	1-249-421-11	CARBON 2.2K 5% 1/4W F	
R015	1-249-437-11	CARBON 47K 5% 1/4W	

Ref. No.	Part No.	Description	Remark
R016	1-249-421-11	CARBON 2.2K 5% 1/4W F	
R017	1-249-429-11	CARBON 10K 5% 1/4W	
R018	1-249-429-11	CARBON 10K 5% 1/4W	
R019	1-249-429-11	CARBON 10K 5% 1/4W	
R020	1-249-429-11	CARBON 10K 5% 1/4W	
R023	1-249-414-11	CARBON 560 5% 1/4W F	
R024	1-249-437-11	CARBON 47K 5% 1/4W	
R025	1-249-437-11	CARBON 47K 5% 1/4W	
R101	1-247-901-11	CARBON 820K 5% 1/4W	
R102	1-249-439-11	CARBON 68K 5% 1/4W	
R103	1-249-441-11	CARBON 100K 5% 1/4W	
R104	1-249-441-11	CARBON 100K 5% 1/4W	
R105	1-249-435-11	CARBON 33K 5% 1/4W	
R106	1-249-425-11	CARBON 4.7K 5% 1/4W F	
R107	1-249-411-11	CARBON 330 5% 1/4W	
R108	1-247-807-31	CARBON 100 5% 1/4W	
R109	1-215-429-00	METAL 2.2K 1% 1/6W	
R110	1-249-417-11	CARBON 1K 5% 1/4W F	
R126	1-215-429-00	METAL 2.2K 1% 1/6W	
R203	1-249-429-11	CARBON 10K 5% 1/4W	
R204	1-249-429-11	CARBON 10K 5% 1/4W	
R205	1-249-429-11	CARBON 10K 5% 1/4W	
R206	1-249-436-11	CARBON 39K 5% 1/4W	
R207	1-249-437-11	CARBON 47K 5% 1/4W	
R208	1-249-417-11	CARBON 1K 5% 1/4W F	
R209	1-215-464-00	METAL 62K 1% 1/6W	
R210	1-215-449-00	METAL 15K 1% 1/6W	
R211	1-215-431-00	METAL 2.7K 1% 1/6W	
R212	1-249-421-11	CARBON 2.2K 5% 1/4W F	
R213	1-249-421-11	CARBON 2.2K 5% 1/4W F	
R214	1-247-885-00	CARBON 180K 5% 1/4W	
R215	1-249-432-11	CARBON 18K 5% 1/4W	
R216	1-249-417-11	CARBON 1K 5% 1/4W F	
R217	1-249-433-11	CARBON 22K 5% 1/4W	
R218	1-249-436-11	CARBON 39K 5% 1/4W	
R219	1-249-433-11	CARBON 22K 5% 1/4W	
R220	1-249-425-11	CARBON 4.7K 5% 1/4W F	
R222	1-249-422-11	CARBON 2.7K 5% 1/4W F	
R224	1-249-421-11	CARBON 2.2K 5% 1/4W F	
R225	1-249-437-11	CARBON 47K 5% 1/4W	
R226	1-249-437-11	CARBON 47K 5% 1/4W	
R301	1-249-429-11	CARBON 10K 5% 1/4W (VC:mesecam)	
R311	1-249-429-11	CARBON 10K 5% 1/4W	
R351	1-249-429-11	CARBON 10K 5% 1/4W	
R355	1-249-429-11	CARBON 10K 5% 1/4W	
R356	1-249-429-11	CARBON 10K 5% 1/4W	
R359	1-249-425-11	CARBON 4.7K 5% 1/4W F	

The components identified by mark ⚠ or dotted line with mark. ⚠ are critical for safety. Replace only with part number specified.

Ref. No.	Part No.	Description				Remark
R362	1-249-417-11	CARBON	1K	5%	1/4W	F
R363	1-249-417-11	CARBON	1K	5%	1/4W	F
R364	1-249-434-11	CARBON	27K	5%	1/4W	
R365	1-249-427-11	CARBON	6.8K	5%	1/4W	F
R366	1-249-427-11	CARBON	6.8K	5%	1/4W	F
R367	1-249-427-11	CARBON	6.8K	5%	1/4W	F
R368	1-249-427-11	CARBON	6.8K	5%	1/4W	F
R369	1-249-423-11	CARBON	3.3K	5%	1/4W	F
R370	1-249-423-11	CARBON	3.3K	5%	1/4W	F
R371	1-249-423-11	CARBON	3.3K	5%	1/4W	F
R372	1-249-427-11	CARBON	6.8K	5%	1/4W	F
R373	1-249-425-11	CARBON	4.7K	5%	1/4W	F
R374	1-249-424-11	CARBON	3.9K	5%	1/4W	F
R375	1-249-401-11	CARBON	47	5%	1/4W	F
R376	1-249-401-11	CARBON	47	5%	1/4W	F
R377	1-249-401-11	CARBON	47	5%	1/4W	F
R378	1-247-807-31	CARBON	100	5%	1/4W	
R401	1-249-441-11	CARBON	100K	5%	1/4W	
R402	1-249-438-11	CARBON	56K	5%	1/4W	
R403	1-249-409-11	CARBON	220	5%	1/4W	F
R404	1-247-891-00	CARBON	330K	5%	1/4W	
R405	1-249-430-11	CARBON	12K	5%	1/4W	
R406	1-249-426-11	CARBON	5.6K	5%	1/4W	
R407	1-249-435-11	CARBON	33K	5%	1/4W	
R408	1-249-432-11	CARBON	18K	5%	1/4W	
R409	1-259-880-11	CARBON	2.2M	5%	1/4W	
R410	1-249-429-11	CARBON	10K	5%	1/4W	
R411	1-249-435-11	CARBON	33K	5%	1/4W	
R418	1-249-417-11	CARBON	1K	5%	1/4W	F
R419	1-247-864-11	CARBON	24K	5%	1/4W	
R420	1-249-410-11	CARBON	270	5%	1/4W	F
R421	1-249-417-11	CARBON	1K	5%	1/4W	F
R422	1-249-426-11	CARBON	5.6K	5%	1/4W	
R423	1-249-437-11	CARBON	47K	5%	1/4W	
R424	1-249-434-11	CARBON	27K	5%	1/4W	
R425	1-249-441-11	CARBON	100K	5%	1/4W	
R426	1-249-434-11	CARBON	27K	5%	1/4W	
R854	1-215-439-00	METAL	5.6K	1%	1/6W	
R855	1-215-423-00	METAL	1.2K	1%	1/6W	
R858	1-249-437-11	CARBON	47K	5%	1/4W	
R859	1-249-429-11	CARBON	10K	5%	1/4W	
R860	1-249-435-11	CARBON	33K	5%	1/4W	
R861	1-249-440-11	CARBON	82K	5%	1/4W	
R866	1-249-393-11	CARBON	10	5%	1/4W	F
R868	1-249-433-11	CARBON	22K	5%	1/4W	
⚠R869	1-249-395-11	CARBON	15	5%	1/4W	F
R870	1-249-434-11	CARBON	27K	5%	1/4W	
R871	1-249-394-11	CARBON	12	5%	1/6W	F
R898	1-249-417-11	CARBON	1K	5%	1/4W	F

Ref. No.	Part No.	Description				Remark
R899	1-249-417-11	CARBON	1K	5%	1/4W	F

< VARIABLE RESISTOR >

RV201	1-238-019-11	RES, ADJ, CARBON 47K
RV202	1-238-019-11	RES, ADJ, CARBON 47K
RV851	1-241-767-21	RES, ADJ, CARBON 100K

< SWITCH >

S001	1-570-953-11	SWITCH, PUSH (1 KEY) (CASSETTE UP/DOWN)
S002	1-570-953-11	SWITCH, PUSH (1 KEY) (REC PROOF)

< TRANSFORMER >

T851	1-423-413-11	TRANSFORMER, BIAS OSCILLATION
T852	1-423-415-11	TRANSFORMER, BIAS OSCILLATION

< VIBRATOR >

X201	1-578-774-11	VIBRATOR, CRYSTAL (12MHz)

****

* A-6721-611-A MF-250 BOARD, COMPLETE

****

(Ref. No. 5,000Series)

	3-957-327-01	RIVET, PUSH
*	3-958-020-01	HOLDER, LCD
*	3-958-021-01	ILLUMINATOR
*	3-958-025-01	SHEET, INSULATING, LCD

< CAPACITOR >

C301	1-126-157-11	ELECT	10uF	20%	16V
C302	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C303	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V
C304	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V
C305	1-163-141-00	CERAMIC CHIP	0.001uF	5%	50V
C306	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C307	1-124-635-00	ELECT	220uF	20%	6.3V
C308	1-163-113-00	CERAMIC CHIP	68PF	5%	50V

< CONNECTOR >

* CN301	1-750-192-21	CONNECTOR, BOARD TO BOARD 22P
CN303	1-695-330-31	PIN, CONNECTOR (PC BOARD) 7P
CN304	1-506-469-11	PIN, CONNECTOR 4P

< DIODE >

D301	8-719-946-30	LED SLR34DC3
D302	8-719-940-99	DIODE SLR-34VC3
D303	8-719-940-99	DIODE SLR-34VC3
D305	8-719-911-19	DIODE 1SS119
D307	8-719-109-96	DIODE RD6.8ES-B1

The components identified by mark ⚠ or dotted line with mark. ⚠ are critical for safety. Replace only with part number specified.

Ref. No.	Part No.	Description			Remark
D308	8-719-109-96	DIODE RD6.8ES-B1			
D309	8-719-109-96	DIODE RD6.8ES-B1			
D310	8-719-109-96	DIODE RD6.8ES-B1			
D311	8-719-109-96	DIODE RD6.8ES-B1			
D312	8-719-109-96	DIODE RD6.8ES-B1			
		< IC >			
IC301	8-759-249-78	IC LC75850E (LCD DRIVE)			
		< LIQUID CRYSTAL >			
LC301	1-810-356-11	DISPLAY PANEL, LIQUID CRYSTAL			
		< TRANSISTOR >			
Q306	8-729-216-22	TRANSISTOR 2SA1162-G			
		< RESISTOR >			
R101	1-216-029-00	METAL CHIP	150	5%	1/10W
R102	1-216-029-00	METAL CHIP	150	5%	1/10W
R103	1-216-029-00	METAL CHIP	150	5%	1/10W
R104	1-216-029-00	METAL CHIP	150	5%	1/10W
R105	1-216-029-00	METAL CHIP	150	5%	1/10W
R301	1-216-073-00	METAL CHIP	10K	5%	1/10W
R302	1-216-073-00	METAL CHIP	10K	5%	1/10W
R303	1-216-073-00	METAL CHIP	10K	5%	1/10W
R304	1-216-073-00	METAL CHIP	10K	5%	1/10W
R305	1-216-073-00	METAL CHIP	10K	5%	1/10W
R306	1-216-035-00	METAL CHIP	270	5%	1/10W
R307	1-216-035-00	METAL CHIP	270	5%	1/10W
R308	1-216-035-00	METAL CHIP	270	5%	1/10W
R310	1-216-057-00	METAL CHIP	2.2K	5%	1/10W
R311	1-216-065-00	METAL CHIP	4.7K	5%	1/10W
R317	1-216-073-00	METAL CHIP	10K	5%	1/10W
R318	1-216-089-91	METAL GLAZE	47K	5%	1/10W
R319	1-216-295-00	METAL CHIP	0	5%	1/10W
R320	1-216-295-00	METAL CHIP	0	5%	1/10W
R324	1-216-081-00	METAL CHIP	22K	5%	1/10W
R325	1-216-089-91	METAL GLAZE	47K	5%	1/10W
R326	1-216-081-00	METAL CHIP	22K	5%	1/10W
R327	1-216-075-00	METAL CHIP	12K	5%	1/10W
R328	1-216-113-00	METAL CHIP	470K	5%	1/10W
R329	1-216-113-00	METAL CHIP	470K	5%	1/10W
R330	1-216-113-00	METAL CHIP	470K	5%	1/10W
R331	1-216-113-00	METAL CHIP	470K	5%	1/10W
R332	1-216-113-00	METAL CHIP	470K	5%	1/10W

Ref. No.	Part No.	Description			Remark
		< SWITCH >			
S302	1-572-907-11	SWITCH, SLIDE (BACKLIGHT)			
S303	1-572-908-11	SWITCH, SLIDE (NTSC PB)			
S304	1-572-907-11	SWITCH, SLIDE (COLOR SYSTEM)			
**********					
*	A-6721-614-A	MF-251 BOARD, COMPLETE			
		**********			
		(Ref. No. 4,000Series)			
		< CAPACITOR >			
C601	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C602	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C621	1-163-141-00	CERAMIC CHIP	0.001uF	5%	50V
C623	1-163-133-00	CERAMIC CHIP	470PF	5%	50V (VC)
C624	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V (VC)
C641	1-163-141-00	CERAMIC CHIP	0.001uF	5%	50V
C643	1-163-133-00	CERAMIC CHIP	470PF	5%	50V (VC)
C644	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V (VC)
		< JACK >			
CJ601	1-568-800-11	JACK, ULTRA SMALL			
CJ661	1-764-788-11	JACK (SMALL TYPE)			
PJ661	1-695-865-11	JACK, PIN 3P (LINE IN 2)			
		< CONNECTOR >			
CN661	1-695-820-11	CONNECTOR, BOARD TO BOARD 12P			
* CN662	1-573-823-11	CONNECTOR, BOARD TO BOARD 9P			
		< DIODE >			
D107	8-719-108-12	DIODE RD9.1E-W			
D601	8-719-940-99	DIODE SLR-34VC3			
D602	8-719-970-67	DIODE SLR-34MCA49			
D603	8-719-970-67	DIODE SLR-34MCA49			
D604	8-719-109-93	DIODE RD6.2ES-B2			
D605	8-719-911-19	DIODE 1SS119			
D606	8-719-911-19	DIODE 1SS119			
D621	8-719-108-12	DIODE RD9.1E-W			
D661	8-719-911-19	DIODE 1SS119			
D662	8-719-911-19	DIODE 1SS119			
D681	8-719-108-12	DIODE RD9.1E-W			
		< IC >			
IC601	1-466-833-11	IC RAY-CATCHER BLOCK, REMOCON (REMOTE CONTROL, RECEIVER)			

Ref. No.	Part No.	Description			Remark
		< COIL >			
L621	1-410-521-11	INDUCTOR 100uH			
L622	1-410-336-11	INDUCTOR 220uH (VC)			
L623	1-410-520-11	INDUCTOR 82uH (VC)			
L641	1-410-521-11	INDUCTOR 100uH			
L642	1-410-336-11	INDUCTOR 220uH (VC)			
L643	1-410-520-11	INDUCTOR 82uH (VC)			
		< TRANSISTOR >			
Q601	8-729-216-22	TRANSISTOR 2SA1162-G			
Q602	8-729-421-19	TRANSISTOR UN2213			
Q603	8-729-140-75	TRANSISTOR 2SD999-CLCK			
Q604	8-729-140-75	TRANSISTOR 2SD999-CLCK			
Q605	8-729-900-89	TRANSISTOR DTC144ES			
Q606	8-729-900-89	TRANSISTOR DTC144ES			
		< RESISTOR >			
R601	1-216-031-00	METAL CHIP	180	5%	1/10W
R602	1-216-021-00	METAL CHIP	68	5%	1/10W
R603	1-216-057-00	METAL CHIP	2.2K	5%	1/10W
R604	1-216-089-91	METAL GLAZE	47K	5%	1/10W
R605	1-216-001-00	METAL CHIP	10	5%	1/10W
R606	1-216-051-00	METAL CHIP	1.2K	5%	1/10W
R607	1-216-065-00	METAL CHIP	4.7K	5%	1/10W
R608	1-216-073-00	METAL CHIP	10K	5%	1/10W
R621	1-216-057-00	METAL CHIP	2.2K	5%	1/10W
R622	1-216-013-00	METAL CHIP	33	5%	1/10W
R623	1-216-295-00	METAL CHIP	0	5%	1/10W
R625	1-216-041-00	METAL CHIP	470	5%	1/10W
R641	1-216-057-00	METAL CHIP	2.2K	5%	1/10W
R642	1-216-013-00	METAL CHIP	33	5%	1/10W
R643	1-216-295-00	METAL CHIP	0	5%	1/10W
R645	1-216-041-00	METAL CHIP	470	5%	1/10W
R663	1-208-798-11	METAL GLAZE	4.7K	0.50%	1/10W
R664	1-208-782-11	METAL GLAZE	1K	0.50%	1/10W
R665	1-216-295-00	METAL CHIP	0	5%	1/10W
R681	1-216-022-00	METAL CHIP	75	5%	1/10W
		< VARIABLE RESISTOR >			
RV661	1-241-906-11	RES, VAR, CARBON 10K (REC LEVEL)			
RV662	1-223-392-11	RES, VAR, CARBON 50K (REC BALANCE)			
RV663	1-223-405-11	RES, VAR, CARBON 1K/1K (PHONE LEVEL)			
		< SWITCH >			
S601	1-571-977-11	SWITCH, TACTIL (ON/STANDBY)			
S602	1-571-977-11	SWITCH, TACTIL (EJECT)			

****

Ref. No.	Part No.	Description			Remark
*	A-6781-298-A	PD-37 BOARD, COMPLETE (AP/NC/UX)			
		**********			
		(Ref. No. 9,000Series)			
		< CAPACITOR >			
C003	1-163-038-00	CERAMIC CHIP	0.1uF		25V
C004	1-124-589-11	ELECT	47uF	20%	16V
C005	1-163-227-11	CERAMIC CHIP	10PF	0.5PF	50V
C006	1-163-227-11	CERAMIC CHIP	10PF	0.5PF	50V
C007	1-163-038-00	CERAMIC CHIP	0.1uF		25V
C008	1-124-589-11	ELECT	47uF	20%	16V
C009	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C010	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C011	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C012	1-126-301-11	ELECT	1uF	20%	50V
C014	1-163-038-00	CERAMIC CHIP	0.1uF		25V
		< CONNECTOR >			
* CN001	1-565-438-11	SOCKET, CONNECTOR (PCB) 10P			
		< DIODE >			
D001	8-719-801-48	DIODE 1SS193			
D002	8-719-801-48	DIODE 1SS193			
D003	8-719-911-19	DIODE 1SS119			
		< IC >			
IC001	8-752-845-47	IC CXP80316-025Q (PDC CONTROL)			
IC002	8-759-168-94	IC MV1820E-CG-MPEE (PDC DECODER)			
IC003	8-759-504-44	IC MM1031XMR (AMP)			
		< JUMPER RESISTOR >			
JR001	1-216-295-00	METAL CHIP	0	5%	1/10W
JR002	1-216-296-91	METAL GLAZE	0	5%	1/8W
		< COIL >			
L001	1-410-521-11	INDUCTOR 100uH			
L002	1-410-509-11	INDUCTOR 10uH			
		< RESISTOR >			
R001	1-216-089-91	METAL GLAZE	47K	5%	1/10W
R002	1-216-089-91	METAL GLAZE	47K	5%	1/10W
R003	1-216-073-00	METAL CHIP	10K	5%	1/10W
R004	1-216-073-00	METAL CHIP	10K	5%	1/10W
R005	1-216-073-00	METAL CHIP	10K	5%	1/10W
		< VIBRATOR >			
X001	1-579-125-11	VIBRATOR, CERAMIC			
X002	1-579-971-11	VIBRATOR, CRYSTAL			

PL-25 **PT-96**

Ref. No.	Part No.	Description	Remark
*	A-6720-613-A	PL-25 BOARD, COMPLETE	
		**********	
			(Ref. No. 5,000Series)
		< CONNECTOR >	
CN101	1-506-469-11	PIN, CONNECTOR 4P	
		< DIODE >	
D101	8-719-047-06	DIODE SEL3713K-TP5	
D102	8-719-047-06	DIODE SEL3713K-TP5	
D103	8-719-047-06	DIODE SEL3713K-TP5	
D104	8-719-047-06	DIODE SEL3713K-TP5	
D105	8-719-047-06	DIODE SEL3713K-TP5	
		< PILOT LAMP >	
PL101	1-517-254-11	LAMP, PILOT	
PL102	1-517-254-11	LAMP, PILOT	
PL103	1-517-254-11	LAMP, PILOT	
PL104	1-517-254-11	LAMP, PILOT	
**********			
*	A-6727-557-A	PT-96 BOARD, COMPLETE (AP)	
		**********	
*	A-6727-559-A	PT-96 BOARD, COMPLETE (UX)	
		**********	
*	A-6727-560-A	PT-96 BOARD, COMPLETE (NP)	
		**********	
*	A-6727-561-A	PT-96 BOARD, COMPLETE (VC)	
		**********	
*	A-6727-562-A	PT-96 BOARD, COMPLETE (NC)	
		**********	
*	A-6727-563-A	PT-96 BOARD, COMPLETE (IT)	
		**********	
			(Ref. No. 3,000Series)
	1-558-924-21	CABLE, PIN (AP/IT/VC)	
*	3-951-893-01	HEAT SINK	
	7-685-646-81	SCREW +BVTP 3X8 TYPE2	
		< BUZZER >	
BZ401	1-529-080-11	BUZZER, PIEZOELECTRIC	
		< CAPACITOR >	
⚠C101	1-104-706-11	FILM 0.22uF 20% 250V	
⚠C102	1-104-705-11	FILM 0.1uF 20% 250V	
⚠C103	1-107-405-11	ELECT 68uF 20% 400V	
⚠C104	1-161-741-00	CERAMIC 0.001uF 10% 400V	
⚠C105	1-161-741-00	CERAMIC 0.001uF 10% 400V	
⚠C106	1-161-741-00	CERAMIC 0.001uF 10% 400V	
⚠C107	1-161-741-00	CERAMIC 0.001uF 10% 400V	
⚠C108	1-161-741-00	CERAMIC 0.001uF 10% 400V	
C121	1-126-103-11	ELECT 470uF 20% 16V	
C122	1-124-471-00	ELECT 1000uF 20% 6.3V	
C125	1-126-233-11	ELECT 22uF 20% 50V	
C131	1-124-120-11	ELECT 220uF 20% 25V	
C132	1-126-233-11	ELECT 22uF 20% 50V	
C141	1-124-477-11	ELECT 47uF 20% 25V	
C142	1-126-101-11	ELECT 100uF 20% 16V	
C152	1-124-443-00	ELECT 100uF 20% 10V	
C161	1-124-126-00	ELECT 47uF 20% 10V	
C162	1-124-442-00	ELECT 330uF 20% 6.3V	
C171	1-124-442-00	ELECT 330uF 20% 6.3V	
C181	1-124-589-11	ELECT 47uF 20% 16V	
C182	1-163-031-11	CERAMIC CHIP 0.01uF 50V	
C183	1-163-037-11	CERAMIC CHIP 0.022uF 10% 25V	
C184	1-126-157-11	ELECT 10uF 20% 16V	
C185	1-124-261-00	ELECT 10uF 20% 50V	
C186	1-124-261-00	ELECT 10uF 20% 50V	
C187	1-124-261-00	ELECT 10uF 20% 50V	
C189	1-163-009-11	CERAMIC CHIP 0.001uF 10% 50V	
C190	1-163-009-11	CERAMIC CHIP 0.001uF 10% 50V	
C195	1-124-589-11	ELECT 47uF 20% 16V	
C196	1-124-589-11	ELECT 47uF 20% 16V	
C197	1-124-589-11	ELECT 47uF 20% 16V	
C404	1-163-031-11	CERAMIC CHIP 0.01uF 50V	
C405	1-163-031-11	CERAMIC CHIP 0.01uF 50V	
C406	1-125-705-11	CAP, DOUBLE LAYERS 0.22F	
C407	1-165-319-11	CERAMIC CHIP 0.1uF 50V	
C408	1-124-442-00	ELECT 330uF 20% 6.3V	
C409	1-165-319-11	CERAMIC CHIP 0.1uF 50V	
C410	1-163-031-11	CERAMIC CHIP 0.01uF 50V	
C411	1-163-234-11	CERAMIC CHIP 20PF 5% 50V	
C412	1-163-213-00	CERAMIC CHIP 0.0022uF 5% 50V	
C413	1-163-235-11	CERAMIC CHIP 22PF 5% 50V	
C414	1-163-031-11	CERAMIC CHIP 0.01uF 50V	
C415	1-163-031-11	CERAMIC CHIP 0.01uF 50V	
C451	1-124-443-00	ELECT 100uF 20% 10V	
C452	1-124-584-00	ELECT 100uF 20% 10V	
C804	1-126-233-11	ELECT 22uF 20% 50V (AP/IT/VC)	
C808	1-163-031-11	CERAMIC CHIP 0.01uF 50V (AP/IT/VC)	
C809	1-126-101-11	ELECT 100uF 20% 16V (AP/IT/VC)	
C810	1-163-031-11	CERAMIC CHIP 0.01uF 50V (AP/IT/VC)	

The components identified by mark ⚠ or dotted line with mark. ⚠ are critical for safety. Replace only with part number specified.

Ref. No.	Part No.	Description		Remark
C811	1-124-927-11	ELECT	4.7uF	20% 100V (AP/IT/VC)
C812	1-163-009-11	CERAMIC CHIP	0.001uF	10% 50V (AP/IT/VC)
C813	1-163-031-11	CERAMIC CHIP	0.01uF	50V (AP/IT/VC)
C814	1-124-126-00	ELECT	47uF	20% 10V (AP/IT/VC)
C817	1-164-161-11	CERAMIC CHIP	0.0022uF	10% 100V (AP/IT/VC)
C819	1-163-031-11	CERAMIC CHIP	0.01uF	50V (AP/IT/VC)
C820	1-124-126-00	ELECT	47uF	20% 10V (AP/IT/VC)
C824	1-124-907-11	ELECT	10uF	20% 50V (AP/IT/VC)
C825	1-124-907-11	ELECT	10uF	20% 50V (AP/IT/VC)
C826	1-124-907-11	ELECT	10uF	20% 50V (AP/IT/VC)
C863	1-163-031-11	CERAMIC CHIP	0.01uF	50V
C865	1-163-031-11	CERAMIC CHIP	0.01uF	50V
C871	1-126-101-11	ELECT	100uF	20% 16V (AP/IT/VC)
C872	1-163-031-11	CERAMIC CHIP	0.01uF	50V (AP/IT/VC)
C873	1-130-483-00	MYLAR	0.01uF	5% 50V (AP/IT/VC)
C874	1-124-907-11	ELECT	10uF	20% 50V (AP/IT/VC)
C875	1-124-907-11	ELECT	10uF	20% 50V (AP/IT/VC)

< AC INLET >

⚠CJ101	1-251-134-11	INLET, AC (NONPOLAR) (AC IN)	

< CONNECTOR >

CN401	1-569-338-11	CONNECTOR, BOARD TO BOARD 19P	
CN402	1-569-338-11	CONNECTOR, BOARD TO BOARD 19P	
* CN403	1-750-201-21	CONNECTOR, BOARD TO BOARD 22P	
* CN404	1-565-439-11	PIN, CONNECTOR (PCB) 10P (AP/NC/UX)	
CN404	1-573-842-11	CONNECTOR, BOARD TO BOARD 10P (VC)	
* CN405	1-573-845-11	CONNECTOR, BOARD TO BOARD 13P	
CN406	1-506-468-11	PIN, CONNECTOR 3P	
CN801	1-568-787-11	PIN, CONNECTOR 10P (NC/NP/UX)	
CN802	1-568-788-21	PIN, CONNECTOR 11P (NC/NP/UX)	

< COMPOSITION CIRCUIT BLOCK >

⚠CP101	1-413-897-11	POWER BLOCK (AP/IT/NC/NP/VC)	

Ref. No.	Part No.	Description	Remark
⚠CP101	1-413-940-11	POWER BLOCK (UX)	

< DIODE >

⚠D101	8-719-510-06	DIODE S1WB60	
⚠D131	8-719-200-82	DIODE 11ES2	
D161	8-719-911-19	DIODE 1SS119	
D162	8-719-109-85	DIODE RD5.1ES-B2	
⚠D181	8-719-911-19	DIODE 1SS119	
⚠D182	8-719-911-19	DIODE 1SS119	
⚠D183	8-719-911-19	DIODE 1SS119	
⚠D184	8-719-911-19	DIODE 1SS119	
⚠D195	8-719-911-19	DIODE 1SS119	
⚠D196	8-719-911-19	DIODE 1SS119	
⚠D403	8-719-200-82	DIODE 11ES2	
D404	8-719-911-19	DIODE 1SS119	
⚠D801	8-719-110-78	DIODE RD33ES-B2	(AP/IT/VC)
D802	8-719-800-76	DIODE 1SS226	(AP/IT/VC)
D851	8-719-404-46	DIODE MA110	(AP/IT/VC)
⚠D865	8-719-200-82	DIODE 11ES2	

< FUSE >

⚠F101	1-576-228-11	FUSE (H.B.C.) T2A 250V	

< HOLDER FUSE >

FH101	1-533-293-11	FUSE HOLDER	
FH102	1-533-293-11	FUSE HOLDER	

< FILTER >

FL184	1-239-803-11	FILTER, EMI	
FL195	1-239-803-11	FILTER, EMI	

< IC >

⚠IC141	8-759-189-48	IC PQ12RE11 (12V REG)	
⚠IC151	8-759-189-49	IC PQ09NF1S (9V REG)	
⚠IC181	8-759-189-47	IC MC34151DR2 (VOLTAGE CONTROL)	
IC401	8-759-247-49	IC MB89095-157 (MODE CONTROL)	(EXCEPT UX)
IC401	8-759-247-50	IC MB89096-129 (MODE CONTROL)	(UX)
IC402	8-759-501-99	IC ST93C46AB1 (EEP ROM)	
IC405	8-759-249-28	IC MM1254XFBE (POWER FAIL DET/RESET PULSE GEN)	
IC871	8-759-512-95	IC TDA8415 (ZWEITON DEMOD)	(AP/IT/VC)

< JUMPER RESISTOR >

JR111	1-216-296-91	METAL GLAZE	0	5%	1/8W
JR151	1-216-295-00	METAL CHIP	0	5%	1/10W
JR401	1-216-296-91	METAL GLAZE	0	5%	1/8W
JR402	1-216-296-91	METAL GLAZE	0	5%	1/8W
JR405	1-216-296-91	METAL GLAZE	0	5%	1/8W

The components identified by mark ⚠ or dotted line with mark. ⚠ are critical for safety. Replace only with part number specified.

PT-96

Ref. No.	Part No.	Description				Remark
JR406	1-216-295-00	METAL CHIP	0	5%	1/10W	
JR407	1-216-295-00	METAL CHIP	0	5%	1/10W	
JR408	1-216-296-91	METAL GLAZE	0	5%	1/8W	
JR409	1-216-296-91	METAL GLAZE	0	5%	1/8W	
JR412	1-216-296-91	METAL GLAZE	0	5%	1/8W	
JR801	1-216-295-00	METAL CHIP	0	5%	1/10W	(AP/IT/VC)
JR811	1-216-295-00	METAL CHIP	0	5%	1/10W	
JR812	1-216-295-00	METAL CHIP	0	5%	1/10W	
JR813	1-216-296-91	METAL GLAZE	0	5%	1/8W	
JR816	1-216-296-91	METAL GLAZE	0	5%	1/8W	(AP/IT/VC)
JR817	1-216-296-91	METAL GLAZE	0	5%	1/8W	(AP/IT/VC)
JR818	1-216-296-91	METAL GLAZE	0	5%	1/8W	(AP/IT/VC)
JR819	1-216-296-91	METAL GLAZE	0	5%	1/8W	
JR820	1-216-296-91	METAL GLAZE	0	5%	1/8W	
JR821	1-216-296-91	METAL GLAZE	0	5%	1/8W	(AP/IT/VC)
JR822	1-216-296-91	METAL GLAZE	0	5%	1/8W	(AP/IT/VC)
JR823	1-216-295-00	METAL CHIP	0	5%	1/10W	
JR824	1-216-295-00	METAL CHIP	0	5%	1/10W	
JR825	1-216-296-91	METAL GLAZE	0	5%	1/8W	(AP/IT/VC)
JR826	1-216-296-91	METAL GLAZE	0	5%	1/8W	(AP/IT/VC)
JR827	1-216-296-91	METAL GLAZE	0	5%	1/8W	(AP/IT/VC)
JR828	1-216-295-00	METAL CHIP	0	5%	1/10W	
JR829	1-216-296-91	METAL GLAZE	0	5%	1/8W	
JR830	1-216-295-00	METAL CHIP	0	5%	1/10W	
JR831	1-216-296-91	METAL GLAZE	0	5%	1/8W	
JR832	1-216-296-91	METAL GLAZE	0	5%	1/8W	
JR833	1-216-295-00	METAL CHIP	0	5%	1/10W	(AP/IT/VC)
JR834	1-216-296-91	METAL GLAZE	0	5%	1/8W	(AP/IT/VC)

< COIL >

⚠L121	1-403-588-11	CIL, CHOKE 22uH	
⚠L122	1-403-588-11	CIL, CHOKE 22uH	
L181	1-408-421-00	INDUCTOR 100uH	
L182	1-410-521-11	INDUCTOR 100uH	
L195	1-410-521-11	INDUCTOR 100uH	
L404	1-414-183-41	INDUCTOR 10uH	
L801	1-414-189-31	INDUCTOR 100uH	(AP/IT/VC)
L802	1-414-183-41	INDUCTOR 10uH	(AP/IT/VC)
L803	1-410-501-11	INDUCTOR 2.2uH	(AP/IT/VC)
L804	1-414-183-41	INDUCTOR 10uH	(AP/IT/VC)
L862	1-408-401-00	INDUCTOR 2.2uH	
L871	1-414-183-41	INDUCTOR 10uH	(AP/IT/VC)

< LINE FILTER >

⚠LF101	1-403-599-11	FILTER, LINE 33MH
⚠LF102	1-403-599-11	FILTER, LINE 33MH

Ref. No.	Part No.	Description				Remark
		< IC LINK >				
⚠PS121	1-532-637-00	LINK, IC 1.0A				
⚠PS123	1-532-675-00	LINK, IC 1.5A				
⚠PS181	1-532-679-11	LINK, IC				
		< TRANSISTOR >				
⚠Q131	8-729-140-93	TRANSISTOR	2SB733-34			
Q132	8-729-421-22	TRANSISTOR	UN2211			
⚠Q161	8-729-140-98	TRANSISTOR	2SD773-34			
Q451	8-729-018-99	TRANSISTOR	2SD2394-F			
Q452	8-729-902-99	TRANSISTOR	DTC114TK			
Q453	8-729-902-99	TRANSISTOR	DTC114TK			
⚠Q801	8-729-173-38	TRANSISTOR	2SA733-K			(AP/IT/VC)
Q802	8-729-422-27	TRANSISTOR	2SD601A-Q			(AP/IT/VC)
Q803	8-729-422-27	TRANSISTOR	2SD601A-Q			(AP/IT/VC)
Q805	8-729-303-37	TRANSISTOR	2SD655-E			(AP/IT/VC)
Q861	8-729-216-22	TRANSISTOR	2SA1162-G			
Q862	8-729-421-19	TRANSISTOR	UN2213			
Q871	8-729-422-27	TRANSISTOR	2SD601A-Q			(AP/IT/VC)
		< RESISTOR >				
⚠R101	1-214-947-00	METAL	2.7M	1%	1/2W	
R125	1-249-423-11	CARBON	3.3K	5%	1/4W	F (AP/IT/NC/UX)
R126	1-216-061-00	METAL CHIP	3.3K	5%	1/10W	(NP/VC)
R131	1-249-417-11	CARBON	1K	5%	1/4W	F
R132	1-260-099-11	CARBON	1K	5%	1/2W	
R133	1-216-061-00	METAL CHIP	3.3K	5%	1/10W	
R161	1-249-412-11	CARBON	390	5%	1/4W	F
R181	1-216-081-00	METAL CHIP	22K	5%	1/10W	
R182	1-216-073-00	METAL CHIP	10K	5%	1/10W	
R405	1-216-095-00	METAL CHIP	82K	5%	1/10W	
R407	1-216-113-00	METAL CHIP	470K	5%	1/10W	
R408	1-216-065-00	METAL CHIP	4.7K	5%	1/10W	
R409	1-216-049-00	METAL CHIP	1K	5%	1/10W	
R412	1-216-198-91	METAL GLAZE	1K	5%	1/8W	
R421	1-216-198-91	METAL GLAZE	1K	5%	1/8W	
R423	1-216-222-00	METAL GLAZE	10K	5%	1/8W	
R431	1-216-049-00	METAL CHIP	1K	5%	1/10W	
R432	1-216-198-91	METAL GLAZE	1K	5%	1/8W	
R433	1-249-417-11	CARBON	1K	5%	1/4W	F
R452	1-216-186-00	METAL GLAZE	330	5%	1/8W	
R453	1-216-047-00	METAL CHIP	820	5%	1/10W	
R454	1-216-065-00	METAL CHIP	4.7K	5%	1/10W	
R455	1-216-073-00	METAL CHIP	10K	5%	1/10W	
R456	1-216-186-00	METAL GLAZE	330	5%	1/8W	
R457	1-216-073-00	METAL CHIP	10K	5%	1/10W	
R458	1-216-186-00	METAL GLAZE	330	5%	1/8W	

The components identified by mark ⚠ or dotted line with mark. ⚠ are critical for safety. Replace only with part number specified.

Ref. No.	Part No.	Description				Remark
R460	1-216-073-00	METAL CHIP	10K	5%	1/10W	
R462	1-216-296-91	METAL GLAZE	0	5%	1/8W	
R463	1-249-417-11	CARBON	1K	5%	1/4W	F
R464	1-249-417-11	CARBON	1K	5%	1/4W	F
R465	1-249-417-11	CARBON	1K	5%	1/4W	F
R466	1-249-417-11	CARBON	1K	5%	1/4W	F
R467	1-249-417-11	CARBON	1K	5%	1/4W	F
R469	1-216-073-00	METAL CHIP	10K	5%	1/10W	
R470	1-216-206-00	METAL GLAZE	2.2K	5%	1/8W	(AP/IT)
R470	1-216-220-00	METAL GLAZE	8.2K	5%	1/8W	(VC)
R470	1-216-224-91	METAL GLAZE	12K	5%	1/8W	(NP)
R470	1-216-230-00	METAL GLAZE	22K	5%	1/8W	(NC)
R470	1-216-296-91	METAL GLAZE	0	5%	1/8W	(UX)
R471	1-216-073-00	METAL CHIP	10K	5%	1/10W	
R473	1-216-049-00	METAL CHIP	1K	5%	1/10W	
R474	1-216-049-00	METAL CHIP	1K	5%	1/10W	
R475	1-216-049-00	METAL CHIP	1K	5%	1/10W	
R478	1-249-417-11	CARBON	1K	5%	1/4W	F
R480	1-249-429-11	CARBON	10K	5%	1/4W	(NP/VC)
R484	1-216-049-00	METAL CHIP	1K	5%	1/10W	
R485	1-249-417-11	CARBON	1K	5%	1/4W	F (NP/VC)
R487	1-216-049-00	METAL CHIP	1K	5%	1/10W	(NP/VC)
R492	1-216-296-91	METAL GLAZE	0	5%	1/8W	
R494	1-249-417-11	CARBON	1K	5%	1/4W	F
R495	1-249-417-11	CARBON	1K	5%	1/4W	F
R496	1-216-073-00	METAL CHIP	10K	5%	1/10W	
R497	1-216-073-00	METAL CHIP	10K	5%	1/10W	
R498	1-216-222-00	METAL GLAZE	10K	5%	1/8W	
R499	1-216-222-00	METAL GLAZE	10K	5%	1/8W	
R801	1-216-198-91	METAL GLAZE	1K	5%	1/8W	(AP/IT/VC)
R802	1-216-198-91	METAL GLAZE	1K	5%	1/8W	(AP/IT/VC)
R803	1-216-182-00	METAL GLAZE	220	5%	1/8W	(AP/IT/VC)
R804	1-216-238-91	METAL GLAZE	47K	5%	1/8W	(AP/IT/VC)
R805	1-216-025-00	METAL CHIP	100	5%	1/10W	(AP/IT/VC)
R806	1-216-071-00	METAL CHIP	8.2K	5%	1/10W	(AP/IT/VC)
R807	1-216-075-00	METAL CHIP	12K	5%	1/10W	(AP/IT/VC)
R808	1-216-049-00	METAL CHIP	1K	5%	1/10W	(AP/IT/VC)
R809	1-216-295-00	METAL CHIP	0	5%	1/10W	(AP/IT/VC)
R810	1-216-025-00	METAL CHIP	100	5%	1/10W	(AP/IT/VC)
R811	1-216-037-00	METAL CHIP	330	5%	1/10W	
R812	1-216-037-00	METAL CHIP	330	5%	1/10W	(AP/IT/VC)
R824	1-216-049-00	METAL CHIP	1K	5%	1/10W	(AP/IT/VC)
R825	1-216-296-91	METAL GLAZE	0	5%	1/8W	(AP/IT/VC)
R827	1-216-296-91	METAL GLAZE	0	5%	1/8W	(AP/IT/VC)
R836	1-216-049-00	METAL CHIP	1K	5%	1/10W	
R837	1-216-049-00	METAL CHIP	1K	5%	1/10W	
R838	1-216-041-00	METAL CHIP	470	5%	1/10W	(NP/VC)
R838	1-216-295-00	METAL CHIP	0	5%	1/10W	(AP/IT/NC/UX)
R853	1-216-113-00	METAL CHIP	470K	5%	1/10W	(AP/IT/VC)
R862	1-216-081-00	METAL CHIP	22K	5%	1/10W	
R864	1-216-049-00	METAL CHIP	1K	5%	1/10W	
R871	1-216-204-00	METAL GLAZE	1.8K	5%	1/8W	(AP/IT/VC)
R872	1-216-049-00	METAL CHIP	1K	5%	1/10W	(AP/IT/VC)
R873	1-216-049-00	METAL CHIP	1K	5%	1/10W	(AP/IT/VC)
R874	1-216-295-00	METAL CHIP	0	5%	1/10W	(AP/IT/VC)
R875	1-216-049-00	METAL CHIP	1K	5%	1/10W	(AP/IT/VC)
R876	1-216-295-00	METAL CHIP	0	5%	1/10W	(AP/IT/VC)
R877	1-216-049-00	METAL CHIP	1K	5%	1/10W	(AP/IT/VC)

< RF MODULATOR >

⚠RF801	1-466-328-11	MODULATOR, RF (RFU-2017)	(AP/IT/NC/NP/VC)
⚠RF801	1-466-347-11	MODULATOR, RF (RFU-2024)	(UX)

< VARIABLE RESISTOR >

RV871	1-241-763-11	RES, ADJ, CARBON 4.7K	(AP/IT/VC)

< TUNER >

⚠TU801	1-693-207-11	TUNER (BTF-3C401)	(AP/IT/VC)

< VIBRATOR >

X401	1-579-463-11	VIBRATOR, CRYSTAL (32KHZ)	
X402	1-579-175-11	VIBRATOR, CERAMIC (10MHz)	
X871	1-567-925-11	VIBRATOR, CRYSTAL (10MHz)	(AP/IT/VC)

****

*	A-6727-558-A	RV-33 BOARD, COMPLETE (EXCEPT VC:mesecam)
		**********
*	A-6727-591-A	RV-33 BOARD, COMPLETE (VC:mesecam)
		**********
		(Ref. No. 1,000series)

< CAPACITOR >

C001	1-163-989-11	CERAMIC CHIP	0.033uF	10%	25V
C002	1-164-699-11	CERAMIC CHIP	0.0033uF	5%	50V
C003	1-124-465-00	ELECT	0.47uF	20%	50V
C004	1-163-100-00	CERAMIC CHIP	20PF	5%	50V
C005	1-163-109-00	CERAMIC CHIP	47PF	5%	50V
C006	1-124-257-00	ELECT	2.2uF	20%	50V
C007	1-163-239-11	CERAMIC CHIP	33PF	5%	50V
C009	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C010	1-163-037-11	CERAMIC CHIP	0.022uF	10%	25V
C011	1-124-463-00	ELECT	0.1uF	20%	50V
C012	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V
C013	1-164-161-11	CERAMIC CHIP	0.0022uF	10%	100V
C014	1-124-465-00	ELECT	0.47uF	20%	50V
C015	1-164-161-11	CERAMIC CHIP	0.0022uF	10%	100V
C016	1-163-095-00	CERAMIC CHIP	12PF	5%	50V

The components identified by mark ⚠ or dotted line with mark. ⚠ are critical for safety. Replace only with part number specified.

RV-33

Ref. No.	Part No.	Description			Remark
C018	1-126-163-11	ELECT	4. 7uF	20%	50V
C019	1-163-031-11	CERAMIC CHIP	0. 01uF		50V
C022	1-163-031-11	CERAMIC CHIP	0. 01uF		50V
C024	1-163-031-11	CERAMIC CHIP	0. 01uF		50V
C025	1-163-031-11	CERAMIC CHIP	0. 01uF		50V
C026	1-126-157-11	ELECT	10uF	20%	16V
C027	1-163-239-11	CERAMIC CHIP	33PF	5%	50V
C029	1-124-465-00	ELECT	0. 47uF	20%	50V
C030	1-163-035-00	CERAMIC CHIP	0. 047uF		50V
C031	1-124-638-11	ELECT	22uF	20%	10V
C032	1-126-162-11	ELECT	3. 3uF	20%	50V
C033	1-124-638-11	ELECT	22uF	20%	10V
C034	1-163-035-00	CERAMIC CHIP	0. 047uF		50V
C036	1-163-031-11	CERAMIC CHIP	0. 01uF		50V
C038	1-163-087-00	CERAMIC CHIP	4PF		50V
C039	1-163-101-00	CERAMIC CHIP	22PF	5%	50V
C044	1-163-031-11	CERAMIC CHIP	0. 01uF		50V
C045	1-124-257-00	ELECT	2. 2uF	20%	50V
C046	1-164-004-11	CERAMIC CHIP	0. 1uF	10%	25V
C047	1-164-004-11	CERAMIC CHIP	0. 1uF	10%	25V
C048	1-163-077-00	CERAMIC CHIP	0. 1uF	10%	25V
C049	1-163-107-00	CERAMIC CHIP	39PF	5%	50V
C050	1-163-123-00	CERAMIC CHIP	180PF	5%	50V
C051	1-163-031-11	CERAMIC CHIP	0. 01uF		50V
C052	1-163-105-00	CERAMIC CHIP	33PF	5%	50V (VC:mesecam)
C052	1-163-107-00	CERAMIC CHIP	39PF	5%	50V (EXCEPT VC:mesecam)
C053	1-124-465-00	ELECT	0. 47uF	20%	50V
C055	1-163-109-00	CERAMIC CHIP	47PF	5%	50V
C056	1-163-139-00	CERAMIC CHIP	820PF	5%	50V
C057	1-163-031-11	CERAMIC CHIP	0. 01uF		50V
C058	1-124-465-00	ELECT	0. 47uF	20%	50V
C059	1-163-031-11	CERAMIC CHIP	0. 01uF		50V
C060	1-163-031-11	CERAMIC CHIP	0. 01uF		50V
C061	1-163-125-00	CERAMIC CHIP	220PF	5%	50V
C062	1-163-127-00	CERAMIC CHIP	270PF	5%	50V
C063	1-163-035-00	CERAMIC CHIP	0. 047uF		50V
C064	1-124-638-11	ELECT	22uF	20%	10V
C065	1-163-121-00	CERAMIC CHIP	150PF	5%	50V
C066	1-163-809-11	CERAMIC CHIP	0. 047uF	10%	25V
C067	1-165-320-11	CERAMIC CHIP	0. 47uF	10%	16V
C073	1-163-113-00	CERAMIC CHIP	68PF	5%	50V
C075	1-163-129-00	CERAMIC CHIP	330PF	5%	50V
C079	1-163-031-11	CERAMIC CHIP	0. 01uF		50V
C081	1-163-091-00	CERAMIC CHIP	8PF		50V
C083	1-163-031-11	CERAMIC CHIP	0. 01uF		50V
C086	1-163-031-11	CERAMIC CHIP	0. 01uF		50V
C087	1-163-031-11	CERAMIC CHIP	0. 01uF		50V

Ref. No.	Part No.	Description			Remark
C098	1-124-638-11	ELECT	22uF	20%	10V
C099	1-163-031-11	CERAMIC CHIP	0. 01uF		50V
C101	1-163-031-11	CERAMIC CHIP	0. 01uF		50V
C102	1-163-131-00	CERAMIC CHIP	390PF	5%	50V
C120	1-124-638-11	ELECT	22uF	20%	10V
C121	1-163-031-11	CERAMIC CHIP	0. 01uF		50V
C203	1-163-031-11	CERAMIC CHIP	0. 01uF		50V (VC:mesecam)
C204	1-126-154-11	ELECT	47uF	20%	6. 3V (VC:mesecam)
C205	1-126-163-11	ELECT	4. 7uF	20%	50V (VC:mesecam)
C206	1-163-035-00	CERAMIC CHIP	0. 047uF		50V (VC:mesecam)
C207	1-124-638-11	ELECT	22uF	20%	10V (VC:mesecam)
C208	1-163-113-00	CERAMIC CHIP	68PF	5%	50V (VC:mesecam)
C209	1-163-031-11	CERAMIC CHIP	0. 01uF		50V (VC:mesecam)
C260	1-163-031-11	CERAMIC CHIP	0. 01uF		50V
C261	1-124-584-00	ELECT	100uF	20%	10V
C262	1-163-031-11	CERAMIC CHIP	0. 01uF		50V
C263	1-163-038-00	CERAMIC CHIP	0. 1uF		25V
C264	1-124-257-00	ELECT	2. 2uF	20%	50V
C265	1-163-031-11	CERAMIC CHIP	0. 01uF		50V
C267	1-163-031-11	CERAMIC CHIP	0. 01uF		50V
C268	1-163-133-00	CERAMIC CHIP	470PF	5%	50V
C269	1-163-133-00	CERAMIC CHIP	470PF	5%	50V
C270	1-163-038-00	CERAMIC CHIP	0. 1uF		25V
C273	1-163-031-11	CERAMIC CHIP	0. 01uF		50V
C274	1-163-038-00	CERAMIC CHIP	0. 1uF		25V
C275	1-126-160-11	ELECT	1uF	20%	50V
C276	1-163-031-11	CERAMIC CHIP	0. 01uF		50V
C278	1-163-113-00	CERAMIC CHIP	68PF	5%	50V (VC:mesecam)
C801	1-163-033-00	CERAMIC CHIP	0. 022uF		50V
C802	1-163-033-00	CERAMIC CHIP	0. 022uF		50V
C803	1-163-033-00	CERAMIC CHIP	0. 022uF		50V
C804	1-163-038-00	CERAMIC CHIP	0. 1uF		25V
C805	1-163-033-00	CERAMIC CHIP	0. 022uF		50V
C806	1-163-117-00	CERAMIC CHIP	100PF	5%	50V
C807	1-163-038-00	CERAMIC CHIP	0. 1uF		25V
C808	1-124-584-00	ELECT	100uF	20%	10V
C809	1-163-038-00	CERAMIC CHIP	0. 1uF		25V
C810	1-124-584-00	ELECT	100uF	20%	10V
C811	1-163-031-11	CERAMIC CHIP	0. 01uF		50V
C813	1-164-336-11	CERAMIC CHIP	0. 33uF		25V
C814	1-163-038-00	CERAMIC CHIP	0. 1uF		25V
C815	1-163-038-00	CERAMIC CHIP	0. 1uF		25V

Ref. No.	Part No.	Description			Remark
C816	1-163-038-00	CERAMIC CHIP	0.1uF		25V
C817	1-163-038-00	CERAMIC CHIP	0.1uF		25V
C818	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C822	1-163-129-00	CERAMIC CHIP	330PF	5%	50V
C826	1-124-229-00	ELECT	33uF	20%	10V
C827	1-163-038-00	CERAMIC CHIP	0.1uF		25V
C829	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C830	1-163-103-00	CERAMIC CHIP	27PF	5%	50V (VC:mesecam)
C830	1-163-107-00	CERAMIC CHIP	39PF	5%	50V (EXCEPT VC:mesecam)
C836	1-163-099-00	CERAMIC CHIP	18PF	5%	50V
C838	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C839	1-163-099-00	CERAMIC CHIP	18PF	5%	50V
C840	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C842	1-126-160-11	ELECT	1uF	20%	50V
C890	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C893	1-163-251-11	CERAMIC CHIP	100PF	5%	50V
C894	1-163-121-00	CERAMIC CHIP	150PF	5%	50V
C895	1-163-245-11	CERAMIC CHIP	56PF	5%	50V
C896	1-163-038-00	CERAMIC CHIP	0.1uF		25V
C897	1-126-157-11	ELECT	10uF	20%	16V
C901	1-163-095-00	CERAMIC CHIP	12PF	5%	50V
C902	1-163-033-00	CERAMIC CHIP	0.022uF		50V
C903	1-163-239-11	CERAMIC CHIP	33PF	5%	50V
C904	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C907	1-163-033-00	CERAMIC CHIP	0.022uF		50V
C908	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C909	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C910	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C911	1-163-243-11	CERAMIC CHIP	47PF	5%	50V
C912	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C913	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C914	1-163-117-00	CERAMIC CHIP	100PF	5%	50V
C916	1-216-295-00	METAL CHIP	0	5%	1/10W
C917	1-163-035-00	CERAMIC CHIP	0.047uF		50V
C920	1-163-129-00	CERAMIC CHIP	330PF	5%	50V
C921	1-124-638-11	ELECT	22uF	20%	10V
C938	1-163-131-00	CERAMIC CHIP	390PF	5%	50V
		< FILTER >			
CF201	1-527-943-00	FILTER, CERAMIC (VC:mesecam)			
		< CONNECTOR >			
CN001	1-573-828-11	CONNECTOR, BOARD TO BOARD 14P			
CN002	1-573-834-11	CONNECTOR, BOARD TO BOARD 20P			
CN801	1-563-590-11	CONNECTOR, FLEXIBLE 13P			
* CN802	1-564-029-00	PIN, CONNECTOR 4P			
* CN803	1-564-013-11	PIN, CONNECTOR 3P			
		< DIODE >			
D801	8-719-801-78	DIODE 1SS184			
D802	8-719-801-78	DIODE 1SS184			
D803	8-719-801-78	DIODE 1SS184			
D901	8-719-951-22	IC IMN10			
		< DELAY LINE >			
DL002	1-415-856-11	DELAY LINE, ULTRASONIC GLASS			
DL003	1-415-728-21	DELAY LINE, 2H (ULTRASONIC)			
DL003	1-415-728-31	DELAY LINE, 2H (ULTRASONIC)			
		< IC >			
IC001	8-759-183-95	IC HA118385FEB (Y.C PROCESSOR)			
IC002	8-759-084-76	IC MM1111XFF (VIDEO INPUT SWITCH)			
IC003	8-759-194-24	IC MSM7450MS-K-TP (IH CCD DELAY LINE)			
IC004	8-759-035-93	IC SC7S32F (GATE)			
IC201	8-759-199-28	IC BA7025F-E2 (SECAMDET) (VC:mesecam)			
IC260	8-759-055-49	IC AN3327K (AFM AUDIO REC/PB AMP)			
IC801	8-759-267-78	IC HA118191ANT (VIDEO REC/PS AMP)			
		< JUMPER RESISTOR >			
JR015	1-216-295-00	METAL CHIP	0	5%	1/10W
JR022	1-216-295-00	METAL CHIP	0	5%	1/10W
JR024	1-216-295-00	METAL CHIP	0	5%	1/10W
JR030	1-216-295-00	METAL CHIP	0	5%	1/10W
		< COIL >			
L001	1-408-970-21	INDUCTOR	10uH		
L002	1-408-975-21	INDUCTOR	27uH		
L003	1-408-970-21	INDUCTOR	10uH		
L004	1-408-972-21	INDUCTOR	15uH		
L005	1-408-972-21	INDUCTOR	15uH		
L006	1-408-974-21	INDUCTOR	22uH		
L007	1-408-982-11	INDUCTOR	100uH		
L008	1-408-982-11	INDUCTOR	100uH		
L009	1-408-980-21	INDUCTOR	68uH		
L010	1-408-976-21	INDUCTOR	33uH		
L011	1-408-983-21	INDUCTOR	120uH		
L012	1-408-429-00	INDUCTOR	470uH		
L013	1-408-427-00	INDUCTOR	330uH		
L014	1-408-978-21	INDUCTOR	47uH		
L015	1-408-982-11	INDUCTOR	100uH		
L017	1-408-985-21	INDUCTOR	180uH		
L018	1-408-982-11	INDUCTOR	100uH		
L202	1-408-982-11	INDUCTOR	100uH (VC:mesecam)		
L260	1-408-982-11	INDUCTOR	100uH		
L801	1-408-948-00	INDUCTOR	220uH		

RV-33

Ref. No.	Part No.	Description		Remark
L802	1-408-948-00	INDUCTOR	220uH	
L803	1-408-982-11	INDUCTOR	100uH	
L804	1-408-982-11	INDUCTOR	100uH	
L810	1-408-985-21	INDUCTOR	180uH	
L812	1-408-982-11	INDUCTOR	100uH	
L813	1-408-970-21	INDUCTOR	10uH	
L814	1-408-970-21	INDUCTOR	10uH	
L890	1-408-968-21	INDUCTOR	6.8uH	
L891	1-408-982-11	INDUCTOR	100uH	
L901	1-408-974-21	INDUCTOR	22uH	
L902	1-408-948-00	INDUCTOR	220uH	
L908	1-408-982-11	INDUCTOR	100uH	
		< TRANSISTOR >		
Q001	8-729-010-25	TRANSISTOR	MSD601-RT1	
Q003	8-729-010-25	TRANSISTOR	MSD601-RT1	
Q004	8-729-010-25	TRANSISTOR	MSD601-RT1	
Q006	8-729-010-25	TRANSISTOR	MSD601-RT1	
Q007	8-729-010-05	TRANSISTOR	MSB709-RT1	
Q011	8-729-010-25	TRANSISTOR	MSD601-RT1	
Q013	8-729-010-25	TRANSISTOR	MSD601-RT1	
Q016	8-729-424-56	TRANSISTOR	UN211L	
Q018	8-729-424-18	TRANSISTOR	UN2113	
Q021	8-729-421-19	TRANSISTOR	UN2213	
Q029	8-729-421-19	TRANSISTOR	UN2213	
Q030	8-729-421-19	TRANSISTOR	UN2213	
Q031	8-729-424-08	TRANSISTOR	UN2111	
Q032	8-729-421-19	TRANSISTOR	UN2213 (VC:mesecam)	
Q032	8-729-424-90	TRANSISTOR	UN221L (EXCEPT VC:mesecam)	
Q033	8-729-424-90	TRANSISTOR	UN221L	
Q034	8-729-230-49	TRANSISTOR	2SC2712-YG	
Q040	8-729-421-19	TRANSISTOR	UN2213	
Q047	8-729-421-19	TRANSISTOR	UN2213 (VC:mesecam)	
Q048	8-729-421-19	TRANSISTOR	UN2213 (VC:mesecam)	
Q051	8-729-421-19	TRANSISTOR	UN2213	
Q055	8-729-421-19	TRANSISTOR	UN2213	
Q201	8-729-010-25	TRANSISTOR	MSD601-RT1 (VC:mesecam)	
Q810	8-729-421-19	TRANSISTOR	UN2213	
Q811	8-729-921-12	TRANSISTOR	2SD1834	
Q817	8-729-230-49	TRANSISTOR	2SC2712-YG	
Q818	8-729-421-19	TRANSISTOR	UN2213	
Q819	8-729-230-49	TRANSISTOR	2SC2712-YG	
Q840	8-729-230-49	TRANSISTOR	2SC2712-YG	
Q841	8-729-216-21	TRANSISTOR	2SA1162Y-TE85L	
Q890	8-729-216-22	TRANSISTOR	2SA1162-G	
Q891	8-729-216-22	TRANSISTOR	2SA1162 -G	
Q892	8-729-421-19	TRANSISTOR	UN2213	
Q904	8-729-230-49	TRANSISTOR	2SC2712-YG	
Q906	8-729-230-49	TRANSISTOR	2SC2712-YG	
Q907	8-729-230-49	TRANSISTOR	2SC2712-YG	
Q908	8-729-230-49	TRANSISTOR	2SC2712-YG	
Q909	8-729-230-49	TRANSISTOR	2SC2712-YG	
Q931	8-729-230-49	TRANSISTOR	2SC2712-YG	
Q938	8-729-421-19	TRANSISTOR	UN2213	
Q939	8-729-424-08	TRANSISTOR	UN2111	
		< RESISTOR >		
R001	1-216-061-00	METAL CHIP	3.3K 5% 1/10W	
R002	1-216-057-00	METAL CHIP	2.2K 5% 1/10W	
R003	1-216-049-00	METAL CHIP	1K 5% 1/10W	
R004	1-216-061-00	METAL CHIP	3.3K 5% 1/10W	
R005	1-216-071-00	METAL CHIP	8.2K 5% 1/10W	
R009	1-216-049-00	METAL CHIP	1K 5% 1/10W	
R010	1-216-081-00	METAL CHIP	22K 5% 1/10W	
R012	1-216-081-00	METAL CHIP	22K 5% 1/10W	
R014	1-216-081-00	METAL CHIP	22K 5% 1/10W	
R016	1-216-049-00	METAL CHIP	1K 5% 1/10W	
R017	1-216-083-00	METAL CHIP	27K 5% 1/10W	
R018	1-216-037-00	METAL CHIP	330 5% 1/10W	
R019	1-216-037-00	METAL CHIP	330 5% 1/10W	
R022	1-216-041-00	METAL CHIP	470 5% 1/10W	
R023	1-216-041-00	METAL CHIP	470 5% 1/10W	
R024	1-216-035-00	METAL CHIP	270 5% 1/10W	
R025	1-216-056-00	METAL GLAZE	2K 5% 1/10W	
R027	1-216-071-00	METAL CHIP	8.2K 5% 1/10W	
R029	1-216-049-00	METAL CHIP	1K 5% 1/10W	
R030	1-216-049-00	METAL CHIP	1K 5% 1/10W	
R035	1-216-069-00	METAL CHIP	6.8K 5% 1/10W	
R040	1-216-121-00	METAL CHIP	1M 5% 1/10W	
R041	1-216-041-00	METAL CHIP	470 5% 1/10W (EXCEPT VC:mesecam)	
R041	1-216-046-00	METAL CHIP	750 5% 1/10W (VC:mesecam)	
R042	1-216-043-00	METAL CHIP	560 5% 1/10W	
R043	1-216-043-00	METAL CHIP	560 5% 1/10W	
R044	1-216-061-00	METAL CHIP	3.3K 5% 1/10W (EXCEPT VC:mesecam)	
R044	1-216-075-00	METAL CHIP	12K 5% 1/10W (VC:mesecam)	
R045	1-216-058-00	METAL GLAZE	2.4K 5% 1/10W	
R046	1-216-045-00	METAL CHIP	680 5% 1/10W	
R047	1-216-059-00	METAL CHIP	2.7K 5% 1/10W	
R048	1-216-063-00	METAL CHIP	3.9K 5% 1/10W	
R049	1-216-063-00	METAL CHIP	3.9K 5% 1/10W	
R050	1-216-081-00	METAL CHIP	22K 5% 1/10W (VC:mesecam)	
R051	1-216-036-00	METAL CHIP	300 5% 1/10W	

Ref. No.	Part No.	Description			Remark
R052	1-216-052-00	METAL CHIP	1.3K	5%	1/10W
R053	1-216-071-00	METAL CHIP	8.2K	5%	1/10W
R055	1-216-071-00	METAL CHIP	8.2K	5%	1/10W
R056	1-216-077-00	METAL CHIP	15K	5%	1/10W
R057	1-216-049-00	METAL CHIP	1K	5%	1/10W
R058	1-216-049-00	METAL CHIP	1K	5%	1/10W
R059	1-216-037-00	METAL CHIP	330	5%	1/10W
R060	1-216-043-00	METAL CHIP	560	5%	1/10W
R061	1-216-073-00	METAL CHIP	10K	5%	1/10W
R062	1-216-065-00	METAL CHIP	4.7K	5%	1/10W
R065	1-216-073-00	METAL CHIP	10K	5%	1/10W
R067	1-216-295-00	METAL CHIP	0	5%	1/10W
R069	1-216-047-00	METAL CHIP	820	5%	1/10W
R070	1-216-049-00	METAL CHIP	1K	5%	1/10W (VC:mesecam)
R071	1-216-058-00	METAL GLAZE	2.4K	5%	1/10W
R072	1-216-072-00	METAL CHIP	9.1K	5%	1/10W
R075	1-216-065-00	METAL CHIP	4.7K	5%	1/10W
R077	1-216-085-00	METAL CHIP	33K	5%	1/10W
R078	1-216-081-00	METAL CHIP	22K	5%	1/10W
R079	1-216-073-00	METAL CHIP	10K	5%	1/10W
R080	1-216-057-00	METAL CHIP	2.2K	5%	1/10W
R082	1-216-055-00	METAL CHIP	1.8K	5%	1/10W
R083	1-216-083-00	METAL CHIP	27K	5%	1/10W
R084	1-216-089-91	METAL GLAZE	47K	5%	1/10W
R085	1-216-045-00	METAL CHIP	680	5%	1/10W
R086	1-216-066-00	METAL CHIP	5.1K	5%	1/10W
R087	1-216-069-00	METAL CHIP	6.8K	5%	1/10W (VC:mesecam)
R088	1-216-065-00	METAL CHIP	4.7K	5%	1/10W (EXCEPT VC:mesecam)
R088	1-216-066-00	METAL CHIP	5.1K	5%	1/10W (VC:mesecam)
R091	1-216-295-00	METAL CHIP	0	5%	1/10W
R092	1-216-065-00	METAL CHIP	4.7K	5%	1/10W (VC:mesecam)
R094	1-216-073-00	METAL CHIP	10K	5%	1/10W
R099	1-216-059-00	METAL CHIP	2.7K	5%	1/10W
R102	1-216-061-00	METAL CHIP	3.3K	5%	1/10W
R113	1-216-295-00	METAL CHIP	0	5%	1/10W
R115	1-216-129-00	METAL CHIP	2.2M	5%	1/10W
R119	1-216-066-00	METAL CHIP	5.1K	5%	1/10W
R204	1-216-049-00	METAL CHIP	1K	5%	1/10W (VC:mesecam)
R205	1-216-073-00	METAL CHIP	10K	5%	1/10W (VC:mesecam)
R206	1-216-065-00	METAL CHIP	4.7K	5%	1/10W (VC:mesecam)
R207	1-216-109-00	METAL CHIP	330K	5%	1/10W (VC:mesecam)
R208	1-216-057-00	METAL CHIP	2.2K	5%	1/10W (VC:mesecam)
R262	1-216-035-00	METAL CHIP	270	5%	1/10W
R263	1-216-067-00	METAL CHIP	5.6K	5%	1/10W
R265	1-216-033-00	METAL CHIP	220	5%	1/10W
R266	1-216-051-00	METAL CHIP	1.2K	5%	1/10W
R267	1-216-035-00	METAL CHIP	270	5%	1/10W
R268	1-216-097-00	METAL CHIP	100K	5%	1/10W
R269	1-216-081-00	METAL CHIP	22K	5%	1/10W (VC:mesecam)
R270	1-216-081-00	METAL CHIP	22K	5%	1/10W (VC:mesecam)
R271	1-216-079-00	METAL CHIP	18K	5%	1/10W
R276	1-216-073-00	METAL CHIP	10K	5%	1/10W
R801	1-216-023-00	METAL CHIP	82	5%	1/10W
R802	1-216-037-00	METAL CHIP	330	5%	1/10W
R805	1-211-955-11	METAL GLAZE	13	0.50%	1/10W (EXCEPT VC:mesecam)
R805	1-211-959-11	METAL GLAZE	20	0.50%	1/10W (VC:mesecam)
R806	1-216-023-00	METAL CHIP	82	5%	1/10W
R807	1-216-023-00	METAL CHIP	82	5%	1/10W
R811	1-216-037-00	METAL CHIP	330	5%	1/10W
R812	1-216-023-00	METAL CHIP	82	5%	1/10W
R815	1-216-081-00	METAL CHIP	22K	5%	1/10W
R816	1-216-057-00	METAL CHIP	2.2K	5%	1/10W
R817	1-216-049-00	METAL CHIP	1K	5%	1/10W
R835	1-216-049-00	METAL CHIP	1K	5%	1/10W (VC:mesecam)
R835	1-216-051-00	METAL CHIP	1.2K	5%	1/10W (EXCEPT VC:mesecam)
R836	1-216-053-00	METAL CHIP	1.5K	5%	1/10W (VC:mesecam)
R836	1-216-056-00	METAL GLAZE	2K	5%	1/10W (EXCEPT VC:mesecam)
R838	1-216-075-00	METAL CHIP	12K	5%	1/10W
R842	1-208-750-11	METAL GLAZE	47	0.50%	1/10W (EXCEPT VC:mesecam)
R842	1-208-753-11	METAL GLAZE	62	0.50%	1/10W (VC:mesecam)
R843	1-216-057-00	METAL CHIP	2.2K	5%	1/10W
R844	1-216-061-00	METAL CHIP	3.3K	5%	1/10W
R846	1-216-059-00	METAL CHIP	2.7K	5%	1/10W
R847	1-216-078-00	METAL GLAZE	16K	5%	1/10W
R856	1-216-033-00	METAL CHIP	220	5%	1/10W
R857	1-216-033-00	METAL CHIP	220	5%	1/10W

RV-33 **SH-11**

Ref. No.	Part No.	Description			Remark
R858	1-216-065-00	METAL CHIP	4.7K	5%	1/10W
R859	1-216-089-91	METAL GLAZE	47K	5%	1/10W
R861	1-216-053-00	METAL CHIP	1.5K	5%	1/10W
R862	1-216-061-00	METAL CHIP	3.3K	5%	1/10W
R863	1-216-047-00	METAL CHIP	820	5%	1/10W
R891	1-216-011-00	METAL CHIP	27	5%	1/10W
R894	1-216-041-00	METAL CHIP	470	5%	1/10W
R895	1-216-054-00	METAL GLAZE	1.6K	5%	1/10W
R896	1-216-095-00	METAL CHIP	82K	5%	1/10W
R897	1-216-089-91	METAL GLAZE	47K	5%	1/10W
R898	1-216-689-11	METAL CHIP	39K	0.5%	1/10W
R901	1-216-039-00	METAL CHIP	390	5%	1/10W
R902	1-216-033-00	METAL CHIP	220	5%	1/10W
R903	1-216-065-00	METAL CHIP	4.7K	5%	1/10W
R904	1-216-295-00	METAL CHIP	0	5%	1/10W
R906	1-216-077-00	METAL CHIP	15K	5%	1/10W
R907	1-216-075-00	METAL CHIP	12K	5%	1/10W
R908	1-216-033-00	METAL CHIP	220	5%	1/10W
R910	1-216-025-00	METAL CHIP	100	5%	1/10W
R913	1-216-057-00	METAL CHIP	2.2K	5%	1/10W
R914	1-216-077-00	METAL CHIP	15K	5%	1/10W
R915	1-216-075-00	METAL CHIP	12K	5%	1/10W
R916	1-216-039-00	METAL CHIP	390	5%	1/10W
R917	1-216-045-00	METAL CHIP	680	5%	1/10W
R918	1-216-043-00	METAL CHIP	560	5%	1/10W
R919	1-216-039-00	METAL CHIP	390	5%	1/10W
R920	1-216-043-00	METAL CHIP	560	5%	1/10W
R921	1-216-049-00	METAL CHIP	1K	5%	1/10W
R922	1-216-047-00	METAL CHIP	820	5%	1/10W
R924	1-216-031-00	METAL CHIP	180	5%	1/10W
R925	1-216-045-00	METAL CHIP	680	5%	1/10W
R926	1-216-025-00	METAL CHIP	100	5%	1/10W
R927	1-216-067-00	METAL CHIP	5.6K	5%	1/10W
R928	1-216-071-00	METAL CHIP	8.2K	5%	1/10W
R929	1-216-043-00	METAL CHIP	560	5%	1/10W
R931	1-216-051-00	METAL CHIP	1.2K	5%	1/10W
R933	1-216-067-00	METAL CHIP	5.6K	5%	1/10W
R947	1-216-067-00	METAL CHIP	5.6K	5%	1/10W
R966	1-216-295-00	METAL CHIP	0	5%	1/10W

< VARIABLE RESISTOR >

RV001	1-238-856-11	RES, ADJ, CERMET 10K
RV003	1-238-856-11	RES, ADJ, CERMET 10K
RV004	1-238-856-11	RES, ADJ, CERMET 10K
RV005	1-238-856-11	RES, ADJ, CERMET 10K
RV006	1-238-857-11	RES, ADJ, CERMET 22K
RV009	1-238-854-11	RES, ADJ, CERMET 2.2K
RV201	1-238-852-11	RES, ADJ, CERMET 470 (VC:mesecam)

Ref. No.	Part No.	Description			Remark
		< TRANSFORMER >			
T001	1-403-617-11	COIL, TANK			
T201	1-409-467-11	COIL (TRAP 7.8K) (VC:mesecam)			
		< VIBRATOR >			
X001	1-760-118-21	VIBRATOR, CRYSTAL (4.43MHz)			
**********					
*	A-6781-302-A	SH-11 BOARD, COMPLETE			
		**********			
		(Ref. No. 8,000Series)			
		< CAPACITOR >			
C821	1-124-257-00	ELECT	2.2uF	20%	50V
C841	1-124-257-00	ELECT	2.2uF	20%	50V
C861	1-126-157-11	ELECT	10uF	20%	16V
C862	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C863	1-124-903-11	ELECT	1uF	20%	50V
		< CONNECTOR >			
* CN801	1-573-841-11	CONNECTOR, BOARD TO BOARD 9P			
* CN802	1-568-786-11	PIN, CONNECTOR 9P			
CN803	1-506-468-11	PIN, CONNECTOR 3P			
CN861	1-506-468-11	PIN, CONNECTOR 3P			
		< DIODE >			
D821	8-719-911-19	DIODE 1SS119			
D822	8-719-911-19	DIODE 1SS119			
D841	8-719-911-19	DIODE 1SS119			
D842	8-719-911-19	DIODE 1SS119			
		< IC >			
IC861	8-759-923-90	IC BA4560 (PHONES AMP)			
IC862	8-759-145-58	IC uPC4558C (LEVEL METER AMP)			
		< COIL >			
L861	1-410-521-11	INDUCTOR 100uH			
		< RESISTOR >			
R821	1-216-121-00	METAL CHIP	1M	5%	1/10W
R822	1-216-099-00	METAL CHIP	120K	5%	1/10W
R823	1-216-081-00	METAL CHIP	22K	5%	1/10W
R825	1-216-081-00	METAL CHIP	22K	5%	1/10W
R826	1-216-295-00	METAL CHIP	0	5%	1/10W
R827	1-216-089-91	METAL GLAZE	47K	5%	1/10W
R829	1-216-295-00	METAL CHIP	0	5%	1/10W
R841	1-216-121-00	METAL CHIP	1M	5%	1/10W
R842	1-216-099-00	METAL CHIP	120K	5%	1/10W
R843	1-216-081-00	METAL CHIP	22K	5%	1/10W

Ref.No.	Part No.	Description			Remark
R845	1-216-081-00	METAL CHIP	22K	5%	1/10W
R846	1-216-295-00	METAL CHIP	0	5%	1/10W
R847	1-216-089-91	METAL GLAZE	47K	5%	1/10W
R849	1-216-295-00	METAL CHIP	0	5%	1/10W
R851	1-216-049-00	METAL CHIP	1K	5%	1/10W
R852	1-216-049-00	METAL CHIP	1K	5%	1/10W
R861	1-216-049-00	METAL CHIP	1K	5%	1/10W
R862	1-216-045-00	METAL CHIP	680	5%	1/10W
R881	1-216-049-00	METAL CHIP	1K	5%	1/10W
R891	1-216-049-00	METAL CHIP	1K	5%	1/10W

****

* A-6754-656-A TU-146 BOARD, COMPLETE (UX)
****

* A-6754-657-A TU-146 BOARD, COMPLETE (NC/NP)
****

(Ref.No. 7,000Series)

< CAPACITOR >

C002	1-126-233-11	ELECT	22uF	20%	50V
C003	1-124-126-00	ELECT	47uF	20%	10V
C004	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C006	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C007	1-126-101-11	ELECT	100uF	20%	16V
C009	1-164-161-11	CERAMIC CHIP	0.0022uF	10%	100V
C010	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C011	1-124-126-00	ELECT	47uF	20%	10V
C012	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C013	1-124-927-11	ELECT	4.7uF	20%	100V
C014	1-163-009-11	CERAMIC CHIP	0.001uF	10%	50V
C017	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C018	1-124-126-00	ELECT	47uF	20%	10V
C019	1-126-101-11	ELECT	100uF	20%	16V
C020	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C022	1-124-907-11	ELECT	10uF	20%	50V
C023	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C024	1-130-483-00	MYLAR	0.01uF	5%	50V (NC/NP)
C025	1-126-101-11	ELECT	100uF	20%	16V
C026	1-124-907-11	ELECT	10uF	20%	50V
C027	1-124-907-11	ELECT	10uF	20%	50V
C028	1-124-907-11	ELECT	10uF	20%	50V
C029	1-124-907-11	ELECT	10uF	20%	50V
C030	1-124-907-11	ELECT	10uF	20%	50V (NC/NP)
C031	1-124-907-11	ELECT	10uF	20%	50V (NC/NP)
C036	1-124-907-11	ELECT	10uF	20%	50V
C037	1-124-907-11	ELECT	10uF	20%	50V
C038	1-124-907-11	ELECT	10uF	20%	50V
C039	1-124-907-11	ELECT	10uF	20%	50V

Ref.No.	Part No.	Description	Remark
		< CONNECTOR >	
CN001	1-568-787-11	PIN, CONNECTOR 10P	
CN002	1-568-788-21	PIN, CONNECTOR 11P	
		< DIODE >	
D001	8-719-800-76	DIODE 1SS226	
⚠D004	8-719-978-94	DIODE DTZ30C-TT11	
D051	8-719-800-76	DIODE 1SS226	
		< IC >	
IC001	8-759-512-95	IC TDA8415 (ZWEITON DEMOD)	(NC/NP)
IC002	8-759-996-43	IC RC4558PS (AMP)	
		< JUMPER RESISTOR >	
JR010	1-216-296-91	METAL GLAZE 0 5%	1/8W (NC/NP)
JR011	1-216-296-91	METAL GLAZE 0 5%	1/8W
JR012	1-216-296-91	METAL GLAZE 0 5%	1/8W
JR013	1-216-296-91	METAL GLAZE 0 5%	1/8W
JR014	1-216-296-91	METAL GLAZE 0 5%	1/8W
JR015	1-216-296-91	METAL GLAZE 0 5%	1/8W (UX)
JR016	1-216-296-91	METAL GLAZE 0 5%	1/8W
JR017	1-216-296-91	METAL GLAZE 0 5%	1/8W
JR018	1-216-296-91	METAL GLAZE 0 5%	1/8W
JR019	1-216-296-91	METAL GLAZE 0 5%	1/8W
JR020	1-216-296-91	METAL GLAZE 0 5%	1/8W
JR021	1-216-296-91	METAL GLAZE 0 5%	1/8W (UX)
JR025	1-216-296-91	METAL GLAZE 0 5%	1/8W (UX)
JR022	1-216-296-91	METAL GLAZE 0 5%	1/8W (NC/NP)
JR023	1-216-296-91	METAL GLAZE 0 5%	1/8W (NC/NP)
JR026	1-216-296-91	METAL GLAZE 0 5%	1/8W (NC/NP)
		< COIL >	
L001	1-414-183-41	INDUCTOR 10uH	
L002	1-414-189-31	INDUCTOR 100uH	
L003	1-414-183-41	INDUCTOR 10uH	
L005	1-414-183-41	INDUCTOR 10uH	
L006	1-414-183-41	INDUCTOR 10uH	
L007	1-414-183-41	INDUCTOR 10uH	
		< DECODER BLOCK >	
⚠NCM01	1-466-902-11	DECODER BLOCK, ONTA (NCA-395A)	(UX)
⚠NCM01	1-466-903-11	DECODER BLOCK (NCA-389A)	(NC/NP)
		< TRANSISTOR >	
Q001	8-729-422-27	TRANSISTOR 2SD601A-Q	
Q002	8-729-422-27	TRANSISTOR 2SD601A-Q	
⚠Q003	8-729-173-38	TRANSISTOR 2SA733-K	

The components identified by mark ⚠ or dotted line with mark. ⚠ are critical for safety. Replace only with part number specified.

TU-146 **VP-39**

Ref. No.	Part No.	Description			Remark
Q005	8-729-422-27	TRANSISTOR	2SD601A-Q		
Q051	8-729-303-37	TRANSISTOR	2SD655-E		
		< RESISTOR >			
R001	1-216-033-00	METAL CHIP	220	5% 1/10W	
R002	1-216-049-00	METAL CHIP	1K	5% 1/10W	
R003	1-216-049-00	METAL CHIP	1K	5% 1/10W	
R004	1-216-075-00	METAL CHIP	12K	5% 1/10W	
R005	1-216-049-00	METAL CHIP	1K	5% 1/10W	
R006	1-216-071-00	METAL CHIP	8.2K	5% 1/10W	
R007	1-216-089-91	METAL GLAZE	47K	5% 1/10W	
R008	1-216-025-00	METAL CHIP	100	5% 1/10W	
R010	1-216-295-00	METAL CHIP	0	5% 1/10W	
R011	1-216-025-00	METAL CHIP	100	5% 1/10W	
R012	1-216-037-00	METAL CHIP	330	5% 1/10W	
R013	1-216-037-00	METAL CHIP	330	5% 1/10W	
R014	1-216-049-00	METAL CHIP	1K	5% 1/10W	(NC/NP)
R015	1-216-049-00	METAL CHIP	1K	5% 1/10W	(NC/NP)
R016	1-216-055-00	METAL CHIP	1.8K	5% 1/10W	(NC/NP)
R021	1-216-049-00	METAL CHIP	1K	5% 1/10W	(UX)
R022	1-216-049-00	METAL CHIP	1K	5% 1/10W	(UX)
R024	1-216-041-00	METAL CHIP	470	5% 1/10W	
R025	1-216-041-00	METAL CHIP	470	5% 1/10W	
R027	1-216-049-00	METAL CHIP	1K	5% 1/10W	
R028	1-216-045-00	METAL CHIP	680	5% 1/10W	
R030	1-216-295-00	METAL CHIP	0	5% 1/10W	
R031	1-216-295-00	METAL CHIP	0	5% 1/10W	(NC/NP)
R033	1-216-081-00	METAL CHIP	22K	5% 1/10W	
R034	1-216-085-00	METAL CHIP	33K	5% 1/10W	
R035	1-216-081-00	METAL CHIP	22K	5% 1/10W	
R036	1-216-085-00	METAL CHIP	33K	5% 1/10W	
R037	1-216-057-00	METAL CHIP	2.2K	5% 1/10W	(NC/NP)
R038	1-216-071-00	METAL CHIP	8.2K	5% 1/10W	(NC/NP)
R039	1-216-057-00	METAL CHIP	2.2K	5% 1/10W	(NC/NP)
R040	1-216-220-00	METAL GLAZE	8.2K	5% 1/8W	(NC/NP)
R041	1-216-097-00	METAL CHIP	100K	5% 1/10W	
R042	1-216-097-00	METAL CHIP	100K	5% 1/10W	
R043	1-216-097-00	METAL CHIP	100K	5% 1/10W	
R044	1-216-097-00	METAL CHIP	100K	5% 1/10W	
R045	1-216-295-00	METAL CHIP	0	5% 1/10W	
R046	1-216-295-00	METAL CHIP	0	5% 1/10W	
R051	1-216-113-00	METAL CHIP	470K	5% 1/10W	
R052	1-216-057-00	METAL CHIP	2.2K	5% 1/10W	
R053	1-216-198-91	METAL GLAZE	1K	5% 1/8W	
		< VARIABLE RESISTOR >			
RV001	1-241-763-11	RES, ADJ, CARBON 4.7K			(NC/NP)

Ref. No.	Part No.	Description			Remark
		< TUNER >			
⚠TU001	1-693-206-11	TUNER (BTF-3U601) (UX)			
⚠TU001	1-693-207-11	TUNER (BTF-3C401) (NC/NP)			
		< VIBRATOR >			
X001	1-567-925-11	VIBRATOR, CRYSTAL (NC/NP)			
**********					
*	A-6781-281-A	VP-39 BOARD, COMPLETE (VC)			
		**********			
		(Ref. No. 9,000Series)			
		< CAPACITOR >			
C201	1-164-004-11	CERAMIC CHIP	0.1uF	10% 25V	
C202	1-163-075-00	CERAMIC CHIP	0.047uF	50V	
C204	1-163-809-11	CERAMIC CHIP	0.047uF	10% 25V	
C206	1-163-989-11	CERAMIC CHIP	0.033uF	10% 25V	
C210	1-163-121-00	CERAMIC CHIP	150PF	5% 50V	
		< CONNECTOR >			
CN201	1-573-824-11	CONNECTOR, BOARD TO BOARD 10P			
		< DIODE >			
D201	8-719-911-19	DIODE 1SS119			
		< IC >			
IC201	8-759-030-60	IC SDA5642 (VSP DECODER)			
IC202	8-759-147-30	IC uPD75004GB-VSX182 (VSP CONTROL)			
		< JUMPER RESISTOR >			
JR201	1-216-296-91	METAL GLAZE 0	5% 1/8W		
		< COIL >			
L241	1-410-509-11	INDUCTOR 10uH			
		< RESISTOR >			
R201	1-216-073-00	METAL CHIP	10K	5% 1/10W	
R202	1-216-073-00	METAL CHIP	10K	5% 1/10W	
R203	1-216-097-00	METAL CHIP	100K	5% 1/10W	
R204	1-216-119-00	METAL CHIP	820K	5% 1/10W	
R205	1-216-025-00	METAL CHIP	100	5% 1/10W	
R206	1-216-119-00	METAL CHIP	820K	5% 1/10W	
R207	1-216-067-00	METAL CHIP	5.6K	5% 1/10W	
R208	1-216-121-00	METAL CHIP	1M	5% 1/10W	
R210	1-216-057-00	METAL CHIP	2.2K	5% 1/10W	
R211	1-216-073-00	METAL CHIP	10K	5% 1/10W	
R212	1-216-073-00	METAL CHIP	10K	5% 1/10W	

The components identified by mark ⚠ or dotted line with mark. ⚠ are critical for safety. Replace only with part number specified.

Ref. No.	Part No.	Description	Remark
R213	1-216-073-00	METAL CHIP 10K 5% 1/10W	
		< VIBRATOR >	
X201	1-577-101-11	VIBRATOR, CERAMIC	
**********			
		MISCELLANEOUS	
		**********	
1	1-467-584-11	SWITCH BLOCK, CONTROL (UX)	
1	1-467-584-21	SWITCH BLOCK, CONTROL (VC:black/mesecam)	
1	1-467-584-31	SWITCH BLOCK, CONTROL (NP)	
1	1-467-584-41	SWITCH BLOCK, CONTROL (NC)	
1	1-467-584-51	SWITCH BLOCK, CONTROL (AP:black)	
1	1-467-584-61	SWITCH BLOCK, CONTROL (IT)	
65	1-555-110-00	CABLE, PIN (NC/NP/UX)	
260	1-543-647-11	HEAD, FE	
267	A-6761-129-A	HEAD BLOCK ASSY, ACE	
282	8-848-623-01	DRUM ASSY, ROTARY UPPER (DZR-67-R)	
M901	8-848-620-11	DRUM ASSY DZH-67A-R	
M902	8-835-489-01	MOTOR, DC U-26K	
M903	X-3733-302-1	MOTOR ASSY, CAM	
M904	X-3727-784-1	MOTOR ASSY (LOADING)	
S1	1-692-062-11	SWITCH, ROTARY (CAM ENCODER)	
**********			
		ACCESSORIES & PACKING MATERIALS	
		**********	
⚠	1-574-056-11	CORD, POWER (VC)	
⚠	1-575-131-11	CORD, POWER (AP/IT/NC/NP)	
	1-575-334-11	CORD, CONNECTION (VIDEO/AUDIO CABLE 1.5m)	
⚠	1-590-865-11	CORD, POWER (UX)	
	1-696-593-11	CORD, CONNECTION (PAL) (AERIAL)	
	3-758-275-11	MANUAL, INSTRUCTION (ENGLISH) (UX)	
	3-758-275-41	MANUAL, INSTRUCTION (DUTCH) (AP/NC)	
	3-758-275-61	MANUAL, INSTRUCTION (SPANISH) (NP)	
	3-758-275-71	MANUAL, INSTRUCTION (FRENCH, GERMAN) (NC/VC)	
	3-758-275-81	MANUAL, INSTRUCTION (SWEDISH, PORTUGUESE, DANISH) (NC)	
	3-758-275-91	MANUAL, INSTRUCTION (ITALIAN) (IT/VC)	
*	3-958-022-01	INDIVIDUAL CARTON (AP/IT/NC/VC)	
*	3-958-022-11	INDIVIDUAL CARTON (UX)	
*	3-958-022-21	INDIVIDUAL CARTON (NP)	
*	3-958-023-01	CUSHION (UPPER)	
*	3-958-024-01	CUSHION (LOWER)	
**********			

Ref. No.	Part No.	Description	Remark
		**********	
		HARDWARE LIST	
		**********	
#1	7-685-648-79	SCREW +BVTP 3X12 TYPE2	
#4	7-682-645-01	SCREW +PS 3X4	
#5	7-685-647-79	SCREW +BVTP 3X10 TYPE2 IT-3	
#6	7-682-548-04	SCREW +P 3X8	
#7	7-685-646-79	SCREW +BVTP 3X8 TYPE2 IT-3	
#8	7-621-732-08	SET-SCT, HEX. 2X3 FLAT POINT	
#10	7-628-254-05	SCREW +PS 2.6X5	
#11	7-624-102-04	STOP RING 1.5, TYPE -E	
#13	7-682-546-04	SCREW +P 3X5	

The components identified by mark ⚠ or dotted line with mark. ⚠ are critical for safety. Replace only with part number specified.

6-1. SYSTEM CONTROL – VIDEO BLOCK INTERFACE

Signal	Pin No.	I/O	STOP/ FF/ REW	TAPE THREAD-ING	TAPE UNTHREAD-ING	PB	PB• PAUSE	SLOW	×2	CUE	REVIEW	REC	REC• PAUSE
V•PB	MA-181 IC203 ㉕	O	H	H	H	L	L	L	L	L	L	H	H
HEAD CONT	MA-181 IC203 ㉖	O	L	L	L	L	HI-Z (2.5 V)	*1	*10	*5	*5	L	L
RF SW P (SW30)	MA-181 IC203 ①	O	*2	*2	*2	*2	*2	*2	*2	*2	*2	*2	*2
Q VD/V MUTE	MA-181 IC203 ②	O	L	L	L	*3	*4	*4	*4	*4	*4	L	L
SP	MA-181 IC203 ㉛	O	*6	*6	*6	*7	*7	*7	*7	*7	*7	*6	*6
ENV GAIN	MA-181 IC203 ㉜	O	*11	*11	*11	*7	*7	*7	*7	*7	*7	*11	*11
REC•P	MA-181 IC203 ⑤	O	L	L	L	L	L	L	L	L	L	L	H
REC	MA-181 IC203 ㉘	O	L	L	L	L	L	L	L	L	L	H	H
V SYNC	MA-181 IC203 ㉕	I	*8	*8	*8	*8	*8	*8	*8	*8	*8	*8	*8
OSD MUTE	MA-181 IC203 ⑪	O	*9	*9	*9	*9	*9	*9	*9	*9	*9	*9	*9
E TAPE	MA-181 IC203 ㉔	O	L	L	L	*12	*12	*12	*12	*12	*12	L	L
NTSC	MA-181 IC203 ㉗	O	H	H	H	*14	*14	*14	*14	*14	*14	H	H
3.58NTSC	MA-181 IC203 ㉘	O	H	H	H	H	H	H	H	H	H	H	H
JOG	MA-181 IC203 ㉙	O	L	L	L	L	H	H	H	H	H	L	L
ORC SETTEI	MA-181 IC203 ⑯	O	L	L	L	L	L	L	L	L	L	*13	*13

*1. Foward slow mode: "HI-Z (2.5 V)" in tape stop, "L" in tape running (approx. 40 msec.).
Foward slow mode: "HI-Z (2.5 V)" in tape stop, "H" in tape running SP mode (approx. 40 msec.).
"L" in tape running EP mode (approx. 40 msec.).
*2. Synchronized with drum rotation. 25 Hz 50% duty pulse.
*3. Normally "L". "H" when CTL signal is not generated.
*4. V period "H" pulse.
*5. "H" in SP mode. "L" in LP/EP mode.
*6. Selected by REC mode. SP mode: "L".
*7. Selected by tape recording mode.

Model / Signal	SP	LP	EP
SP ㉛	L	H	H
ENV GAIN ㉜	L	L	H

*8. Composite Sync signal (positive).
*9. "H" when menu screen or blue back screen.
*10. "HI-Z (2.5 V)" in LP/EP mode. "H" in SP mode.
*11. Selected by REC mode: "H" EP mode.
*12. "L" when APC is off. "H" when APC is ON and "HG tape" is used.
*13. "H" during APC measurement.
*14. "L" when NTSC system video tape is played back.

6-2. SYSTEM CONTROL – SERVO PERIPHERAL CIRCUIT INTERFACE

Signal	Pin No.	I/O	STOP	FF	REW	TAPE THREAD-ING	TAPE UNTHREAD-ING	PB	PB• PAUSE	SLOW	×2	CUE	REVIEW	REC	REC• PAUSE	PB INDEX WRT/ERS
REC CTL	MA-181 IC203 ⑦	O	*1	*1	*1	*1	*1	*1	*1	*1	*1	*1	*1	*1	*1	
$\overline{\text{CAP STOP}}$	MA-181 IC203 ⑧	O (O.D)	L	HI-Z (O.D)	HI-Z (O.D)	HI-Z (O.D)	HI-Z (O.D)	HI-Z (O.D)	L	*3	HI-Z (O.D)	HI-Z (O.D)	HI-Z (O.D)	HI-Z (O.D)	L	
STEP PLS	MA-181 IC203 ㉔	O	L	L	L	L	L	L	L	*2	L	L	L	L	L	
CTL REC	MA-181 IC203 ㉞	O	L	L	L	L	L	L	L	L	L	L	L	H	H	H
INDEX	MA-181 IC203 ㉟	O	L	L	L	L	L	L	L	L	L	L	L	L	L	H
PB CTL	MA-181 IC203 ㊲	I	H/L	*6	*6			*1	H/L	*2	*6	*6	*6	*1	H/L	
VD CTL	MA-181 IC203 ㊳	I	H/L	*6	*6			*1	H/L	*2	*6	*6	*6	*1	H/L	
DRUM PG	MA-181 IC203 ㊴	I	*4	*7	*7	*5	*5	*7	*7	*7	*7	*7	*7	*7	*7	
DRUM FG	MA-181 IC203 ㊵	I	H/L	*8	*8	*5	*5	*8	*8	*8	*8	*8	*8	*8	*8	
CAP FG	MA-181 IC203 ㊶	I	H/L	*6	*6	*5	*5	*6	H/L	*9	*6	*6	*6	*6	H/L	
CAP DA	MA-181 IC203 ㊷	O	*10	*10	*10	*10	*10	*11	*10	*10	*11	*11	*11	*11	*10	
DRUM DA	MA-181 IC203 ㊹	O	*12	*12	*12	*12	*12	*12	*12	*12	*12	*12	*12	*12	*12	
CTL STEP	MA-181 IC203 ㊺	O	L	L	L	L	L	L	L	*13	L	L	L	L	L	

*1. 30 Hz or 25 Hz pulse.
*2. Pulse at tape running.
*3. Reverse logic pulse of STEP PLS.
*4. "L" when drum rotation stop.
*5. Unstable period pulse.
*6. Pulse of period in proportion to tape speed.
*7. 30 Hz or 25 Hz pulse.
*8. 360 Hz or 300 Hz pulse.
*9. Pulse at tape running.
*10. Approx. 2 msec period "H" or "L" pulse.
*11. Approx. 1.5 msec period "H" or "L" pulse.
*12. Approx. 3 msec period "H" or "L" pulse.
*13. "H" when FWD direction STEP drive.

6-3. SYSTEM CONTROL – MECHANISM BLOCK INTERFACE

Signal	Pin No.	I/O	HI-SPEED REW	EJECTED	CASSETTE LOADING	CASSETTE UNLOAD-ING	TAPE THREAD-ING	TAPE UNTHREAD-ING	STOP	FF	REW	PB	PB• PAUSE	SLOW	×2	CUE	REVIEW	REC	REC• PAUSE
CAM *1	MA-181 IC203 ⑫	O	L	L	L	L	H	H	L	L	L	L	L	L	L	L	L	L	L
LOAD	MA-181 IC203 ⑭	O	L	L	H	H	L	L	L	L	L	L	L	L	L	L	L	L	L
CW/CCW	MA-181 IC203 ⑬	O			H	L	H	L											
MODE 1	MA-181 IC203 ㊾	I	H	L	L	L	H	H	L	H	H	H	L	L	H	H	H	H	L
MODE 2	MA-181 IC203 ㊼	I	L	H	H	H	H	H	L	L	L	L	H	H	L	L	L	L	H
MODE 3	MA-181 IC203 ㊽	I	H	H	H	H	L	L	L	L	L	H	H	H	H	H	L	H	H
MODE 4	MA-181 IC203 ㊺	I	H	H	H	H	H	H	L	H	H	L	L	L	L	L	L	L	L
REC PRF	MA-181 IC203 ⑮	I	*2	L	*2	*2	*2	*2	*2	*2	*2	*2	*2	*2	*2	*2	*2	*2	*2
C-UP/DOWN	MA-181 IC203 ⑯	I	L	H	H→L	L→H	L	L	L	L	L	L	L	L	L	L	L	L	L
TREEL FG	MA-181 IC203 ㉔	I	*3	H/L	H/L	H/L	H/L	H/L	H/L	*3	*3	*3	H/L	*3	*3	*3	*3	*3	H/L
SREEL FG	MA-181 IC203 ㉓	I	*3	H/L	H/L	H/L	*3	*3	H/L	*3	*3	*3	H/L	*3	*3	*3	*3	*3	H/L
END LED	MA-181 IC203 ㉜	O (O.D)	*4	*4	*4	*4	*4	*4	*4	*4	*4	*4	*4	*4	*4	*4	*4	*4	*4
CAP TRQ 1	MA-181 IC203 ㉞	O (O.D)	*1							*1	*1			*6		*1	*1		
CAP TRQ 2	MA-181 IC203 ㉝	O (O.D)								*1	*1								
CAP RVS	MA-181 IC203 ㉞	O	H	H			L	H	H/L	L	H	L	L	L/*5	L	L	H	L	L
T SENS	MA-181 IC203 ⑰	I	*7	*4	*4	*4	*7	*7	*7	*7	*7	*7	*7	*7	*7	*7	*7	*7	*7
S SENS	MA-181 IC203 ⑱	I	*7	*4	*4	*4	*7	*7	*7	*7	*7	*7	*7	*7	*7	*7	*7	*7	*7

*1. "L" when mechanism mode transition.
*2. "L" when erasing protection tab is bent, "H" when not bent.
*3. Pause of period in proportion to reel rotating speed.
*4. Approx. 2 msec period "H" pulse.
*5. Pulse at tape running.
*6. "L" when tape running and CAP RVS is "H".
*7. Normally "L". 2 msec period "H" pulse when tape top or tape end is detected.

6-4. SYSTEM CONTROL – SYSTEM CONTROL PERIPHERAL CIRCUIT INTERFACE

Signal	Pin No.	I/O	I/O level
COSMO•RESET	MA-181 IC203 ㊵	I	Normally "H". "L" when service interruption is detected or restored.
COSMO•CS	MA-181 IC203 ㊹	I	Chip select signal from timer microprocessor. V period "L" pulse.
SI•BUS	MA-181 IC203 ㊺	I	Serial communication data from timer microprocessor. V period "L" pulse.
SO•BUS	MA-181 IC203 ㊻	O	Serial communication data to timer microprocessor. V period "L" pulse.
S CLK	MA-181 IC203 ㊼	I	Serial communication clock with timer microprocessor. V period "L" pulse.

6-5. SYSTEM CONTROL – AUDIO BLOCK INTERFACE

Signal	Pin No.	I/O	STOP/ FF/ REW	TAPE LOADING	TAPE UNLOAD-ING	PB	PB• PAUSE	SLOW	×2	CUE	REVIEW	REC	REC• PAUSE
AF ENVELOP	MA-181 IC203 ㊽	I	AF RF envelope signal input terminal for automatic tracking.										
NA PB	MA-181 IC203 ⑪	O	L	L	L	H	H	H	H	H	H	L	L
A MUTE	MA-181 IC203 ㊼	O (O.D)	L	L	L	*4	H	H	H	H	H	L	L
$\overline{SP}$	MA-181 IC203 ㊾	O	*2	*2	*2	*3	*3	*3	*3	*3	*3	*2	*2
NA REC•$\overline{P}$	MA-181 IC203 ㊿	O	L	L	L	L	L	L	L	L	L	H	L
AF REC•$\overline{P}$	MA-181 IC203 ④	O	L	L	L	L	L	L	L	L	L	H	L
AF SWP	MA-181 IC203 ⑯	O	*1	*1	*1	*1	*1	*1	*1	*1	*1	*1	*1
AF SW POSITION	MA-181 IC203 ㊾	I	Input terminal for AF switching position adjustment.										
FULL $\overline{ERS}$	MA-181 IC203 ㊺	O (O.D)	H	H	H	H	H	H	H	H	H	L	H
METER (L)	MA-181 IC203 ㊽	I	Level meter input (L)										
METER (R)	MA-181 IC203 ㊾	I	Level meter input (R)										

*1. 30 Hz 50% duty pulse approx. 5 msec delayed from RF SW P.
*2. Selected by REC mode selector. SP mode: "L".
*3. Selected by tape recording mode. SP mode: "L".
*4. Nomaly "L", "H" when there is not CTL pulse.

6-6. SYSTEM CONTROL AND RF MODULATOR – INPUT SELECTION BLOCK INTERFACE

Signal	Pin No.	I/O	I/O level
LINE 1	MA-181 IC203 ㊸	O	*1. Input select control signal.
LINE 2	MA-181 IC203 ㊷	O	

*1.

Signal \ Input	Tuner	LINE 1	LINE 2
LINE 1 ㊸	L	H	L
LINE 2 ㊷	L	L	H

6-7. SERVO/SYSTEM CONTROL MICROPROCESSOR PIN FUNCTION (MA-181 BOARD IC203 CXP80732-613Q)

Pin No.	Pin Name	I/O	Function
1	RF SWP	O	Video switching pulse output
2	Q VD	O	Quasi VD pulse output
3	Q HD ENBL	O	Quasi HD voltage level control
4	AF REC $\overline{P}$	O	"H" output when hi-fi audio REC
5	RECP	O	"H" output when video REC•PAUSE
6	FE ON	O	Flaying erase ON/OFF
7	REC CTL	O	REC CTL output
8	INT VD	O	Internal VD signal. Not used
9		O	Not used
10		O	Not used
11	NA PB	O	"H" when normal audio playback
12	CAM	O	CAM motor select
13	CW	O	Clockwise/counterclockwise signal output
14	LOAD	O	Loading motor select
15	CIN/REC PRF	I	Erasing protection tab, cassette IN detection input
16	C DOWN	I	Cassette up/down detection input
17	T SENS	I	Take up end sensor input
18	S SENS	I	Supply end sensor input
19	MOD CONT	O	RF modulator ON/OFF control
20	AV CONT	O	Euro connector pin ㉑ control
21	MESECAM	I	ME SECAM input
22	SECAM	I	SECAM input
23	VPB	O	VPB reverse
24	STEP PLS	O	"H" when capstan step drive
25			
26	$\overline{3.58\ NTSC}$	O	"H"
27	$\overline{NTSC}$	O	"H" "L" when NTSC tape is play back
28	E-TAPE	O	"H" when HG tape using
29	BS BILING	O	"H" when BS bilingual. Not used
30	C+CONT	O	CANAL + control.
31		O	Not used
32	END LED	O	END sensor LED drive output
33	CAP TPQ2	O	Capstan current control. "L" when FF/REW ➡ stop
34	CAP TPQ1	O	Capstan current control. "L" when slow down
35	PAL	O	"H" "L" when NTSC tape is play back
36	$\overline{FULL\ ERS}$	O	"L" when full erase head operation
37	A MUTE	O	Audio MUTE output
38	$\overline{CAP\ STOP}$	O	Capstan STOP signal output
39	MP	I	Fixed at "L" level
40	$\overline{COSMO\ RST}$	I	System reset input
41			GND
42	XTAL		System clock 12 MHz
43	EXTAL		
44	$\overline{COSMO\ CS}$	I	Chip select signal
45	SI0	I	Signal for serial communication
46	SO0	O	
47	SCLK	I	
48	L METER	I	Level meter input (L)
49	R METER	I	Level meter input (R)

Pin No.	Pin Name	I/O	Function
50	NTPB SW	I	Not used
51	AF SW POSI	I	VR input for hi-fi switching pulse position adjustment
52	AVss		GND
53	AVREF		AD port reference input. UNSW 5 V
54	AVDD		UNSW 5 V
55	MODE4	I	Mechanism section CAM encoder input
56	MODE3	I	
57	MODE2	I	
58	MODE1	I	
59	DEW	I	DEW sensor input. Not used
60	RF ENV	I	Video RF envelope input
61	AF ENV	I	hi-fi audio RF envelope input
62	RF SW POSI	I	VR input for RF switching position adjustment
63	SREEL FG	I	S reel sensor input
64	TREEL FG	I	T reel sensor input
65	NT JUDGE	I	Not used
66	V SYNC	I	Composite sync input
67	PB CTL	I	Playback CTL input
68	DRM PG	I	Drum PG input
69	DRM FG	I	Drum FG input
70	CAP FG	I	Capstan FG input
71	OSD MUTE	O	"H" when blue back
72		O	Not used
73	CAP D/A	O	Capstan error D/A output
74	DRM D/A	O	Drum error D/A output
75	$\overline{EP}$	O	"L" when EP mode REC
76	ORC SETTEI	O	"H" when ORC measurement
77	VD CTL	I	Playback CTL input
78	AMS IN	I	Not used
79	LINE1	O	Video/audio input select signal
80	SO1	O	Expansion port for serial communication
81	SCK1	O	
82	LINE2	O	Video/audio input select signal
83	$\overline{NA\ REC\ P}$	I/O	"H" when recording normal audio
84	CAP RVS	I/O	Capstan reverse signal output
85	HEAD CONT	I/O	Head select control
86		I	Not used
87		O	Not used
88			GND
89			UNSW 5 V
90			Connected to UNSW 5 V
91	$\overline{SP}$	O	"L" when SP mode
92	ENV GAIN	O	RF envelope gain control
93	CTL STEP	O	CTL amp step control
94	CTL REC	O	CTL amp recording inhibition
95	$\overline{V\ PB}$	O	"L" when video playback
96	CTL INDEX	O	CTL amp index control
97	JOG	O	"H" when trick play mode
98	REC	O	Rise up signal of head amp recording power
99	LP HEAD	O	(PAL) Head select control
100	AF SWP	O	hi-fi switching pulse output

6-8. TIMER, TUNER, MODE CONTROL MICROPROCESSOR PIN FUNCTION (PT-96 BOARD IC401 MB89095-157/MB89096-129)

Pin No.	Pin Name	I/O	Function
1	CL1		Connected to oscillator for clock
2	CL0		Connected to oscillator for clock
3	MOD0		
4	MOD1		
5	X0		Connected to main oscillator
6	X1		Connected to main oscillator
7	Vss		
8	$\overline{\text{RESET}}$	I	Reset signal in
9	B. LIGHT SW IN	I	Back light off switch reading input
10	DIMMER SW IN	I	DIMMER ON/OFF switch reading input
11	B. LIGHT LED	O	LCD back light on/off control signal
12	B. LIGHT CONT	O	LCD back light ON/OFF control signal
13	DIMMER CONT		Back light luminance control signal
14	$\overline{\text{LCD CS}}$	O	LCD driver chip select signal
15	$\overline{\text{COSMO RESET}}$	O	System controller reset signal
16	$\overline{\text{CG CS}}$	O	Character generator chip select signal
17	$\overline{\text{POWER FAIL}}$	I	Power failure detect signal in
18	$\overline{\text{V SYNC}}$	I	V sync. signal in
19	POWER CONT	O	Power ON/OFF control signal
20	$\overline{\text{COSMO CS}}$	O	System controller chip select signal
21	H DET	I	Video signal detect signal in
22	C+DET	I	CANAL + det. signal in
23	SCL	I/O	I²C bus clock
24	SDA	I/O	I²C bus data
25	$\overline{\text{PAUSE}}$	O	PAUSE LED
26	$\overline{\text{TIMER}}$	O	TIMER RED
27	$\overline{\text{REC}}$	O	REC RED
28	CMOD		
29	TA MUTE	O	Tuner audio mute control signal
30	C+CLK	O	Clock for CANAL + control
31	C+DATA	O	Data for CANAL + control
32	SIRCS IN	I	SIRCS signal in
33	PLL CLOCK	O	Tuner clock signal
34	PLL DATA	O	Tuner data signal
35	PLL ENABLE	O	Tuner enable signal
36	PDC DET	I	PDC det. in
37	$\overline{\text{VPS/PDC RST}}$ (AP, NC, UX, VP) SYS1 (B)	O	VPS, PDC microcomputer reset Tuner system select 1
38	$\overline{\text{VPS/PDC CS}}$ (AP, NC, UX, VP) SYS2 (B)	O	VPS, PDC microcomputer chip select Tuner system select 2
39-48	N. C.		
49	Vcc		
50-52	N.C.		
53	V1dp		
54-57	N. C.		
58	Vss		
59-66	N. C.		
67	Vcc		
68-74	N. C.		
75		O	
76	POWER CONT 2	O	Power supply control signal for EDS
77	SO BUS	I	Serial data input
78	SI BUS	O	Serial data output
79	S CLK	O	Clock for serial communication
80	MEM CS	O	E² PROM chip select signal
81	MEM CLK	O	E² PROM clock
82	MEM DATA	O	E² PROM data
83	AVss		
84	AFT	I	Tuner AFT input
85	A/D1	I	Key reading A/D input
86	A/D2	I	Key reading A/D input
87	A/D3	I	Key reading A/D input
88	A/D4	I	Key reading A/D input
89	A/D5	I	Key reading A/D input
90	A/D6	I	Key reading A/D input
91	A/D7	I	Key reading A/D input
92	AVcc		
93	A/D8	I	Key reading A/D input
94	DEST 1	I	Destination discriminating A/D input
95	DEST 2	I	Destination discriminating A/D input
96	A/D11	I	Key reading A/D input
97	LANC IN	I	LANC signal input
98	LANC OUT	O	LANC signal output
99	BUZZER	O	Buzzer out
100	Vcc		

SECTION 7
ADJUSTMENTS

During the adjustment, see the Parts Arrangement Diagram for adjustments on Page 7-7.

7-1. MECHANICAL ADJUSTMENTS

Refer to the SERVICE MANUAL of VHS MECHANICAL ADJUSTMENT II.

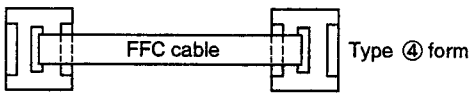
7-2. ELECTRICAL ADJUSTMENTS

2-1. PRE-ADJUSTMENT PREPARATIONS

Necessary items and indications for total adjustment of electric circuit of this machine will be described in this chapter.

2-1-1. Instruments to be Used

1) Color TV
2) Oscilloscope 1 or 2 phenomena, band more than 30 MHz, delay mode, as provided.
3) Frequency counter (min. 8 digits)
4) PAL, SECAM pattern generator
5) Digital voltmeter
6) Audio level meter
7) Audio generator
8) Attenuator
9) Alignment tape
   Part Code: H7099052H (MH-2)
10) Extension cables (See page 7-2 for using location)



① CG-20 (CN401) ↔ PT-96 (CN405)
(13 pins J-6090-045-A)
② HF-34 (CN101) ↔ MA-181 (CN406)
(11 pins J-6090-047-A)
③ HF-34 (CN102) ↔ MA-181 (CN405)
(11 pins J-6090-047-A)
④ RV-33 (CN001) ↔ MA-181 (CN303)
(14 pins J-6090-044-A)
⑤ RV-33 (CN002) ↔ MA-181 (CN304)
(20 pins J-6090-043-A)

2-1-2. Connection

Unless otherwise specified, connect and adjust the measuring instruments as shown in the following diagram.

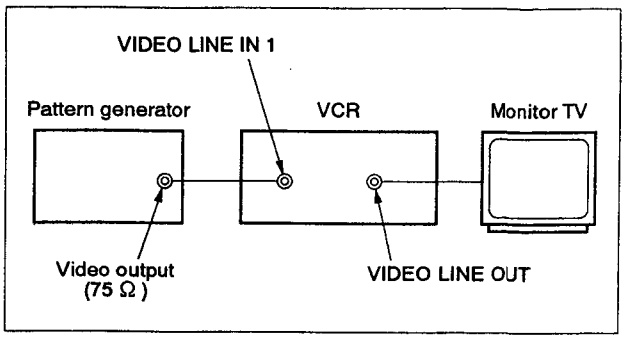


Fig. 7-2-1.

2-1-3. Set-up Adjustment

In this adjustment, PAL pattern generator is connected with LINE 1 input signal terminal. When check to tuner, connected AERIAL terminal. Check that the amplitudes of video signal SYNC signal, of picture portions, and of burst signals are flat at approximately 0.3, 0.7 and 0.3 V, respectively, and that the level ratio of the burst sigal and "red" signal are 0.30 : 0.66. Fig. 7-2. shows video signals (color bars) used in adjusting the video section

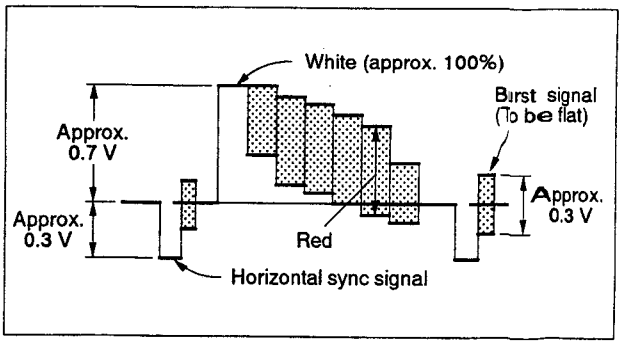


Fig. 7-2-2.

2-1-4. Alignment Tape (MH-2)

	Time	Video signal	Audio signal
1	10 minutes	Stair-step	6 kHz
2	5 minutes	—	3 kHz
3	10 minutes	Color bar	1 kHz
4	3 minutes	RF sweep	–

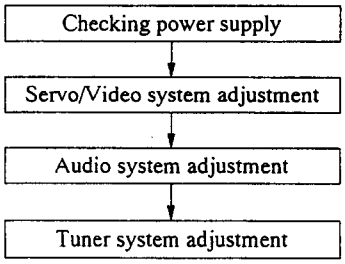
2-1-5. Specified I/O Level and Impedance

Input/output terminal

Video inputs	LINE IN	: phono jack
	EURO-AV	: 21-pin (Pin ⑳) 1 Vp-p, 75 Ω, unbalanced, sync negative
Audio inputs	LINE IN	: phono jacks
		47 kΩ, − 7.5 dBs (0 dBs = 0.775 Vrms)
	EURO-AV	: 21-Pin (Pin ② and ⑥)
		More than 10 kΩ, − 4 dBs
Video outputs	LINE OUT	: phono jack
	EURO-AV	: 21-pin (Pin ⑲) 1 Vp-p, 75 Ω, unbalanced, sync negative
Audio outputs	LINE OUT	: phono jacks
		− 7.5 dBs at load
		impedance 47 kΩ
	Output impedance	: less than 10 kΩ
	EURO-AV	: 21-Pin (Pin ① and ③)
	Output impedance	: less than 1 kΩ
		− 4 dBs with 10 kΩ load

2-1-6. Adjusting Sequence

Make the electrical adjustment in the following sequence.



2-2. POWER SUPPLY CHECK (PT-96 BOARD)

Mode	E-E
Measuring Instrument	Digital voltmater
UNSW 5.0 V check	
Measurement Point	Pin ⑭ of CN401
Specified Value	5.3 ± 0.2 Vdc
MTR 12 V check	
Measurement Point	Pin ⑤ of CN402
Specified Value	12.4 ± 0.5 Vdc
DC 42 V check	
Measurement Point	C187 ⊕ side
Specified Value	42.0 ± 3.0 Vdc
UNSW − 8 V check	
Measurement Point	Pin ⑨ of CN401
Specified Value	− 9.1 ± 0.8 Vdc
AN 12 V check	
Measurement Point	Pin ⑧ of CN401
Specified Value	12.0 ± 0.3 Vdc
SW 9 V check	
Measurement Point	Pin ⑮ of CN401
Specified Value	9.0 ± 0.3 Vdc

Checking Method:

1) Confirm that each voltage meets its specified value.

2-3. SERVO/VIDEO SYSTEM ADJUSTMENTS

- **NOTE ON REPAIRING RV-33 BOARD**

[Servicing Jig]

RV-33 ↔ MA-181 Extension cable.

ⓐ 14 pins (J-6090-044-A) CN001 ↔ CN303

ⓑ 20 pins (J-6090-043-A) CN002 ↔ CN304

① There are two types of the connectors between MA-181 and RV-33 boards according to the manufacturing companies (TAIKO or MOLEX). They are not interchangeable.

② Servicing jigs are for common use.
When using it, please be sure to confirm the form of connectors.

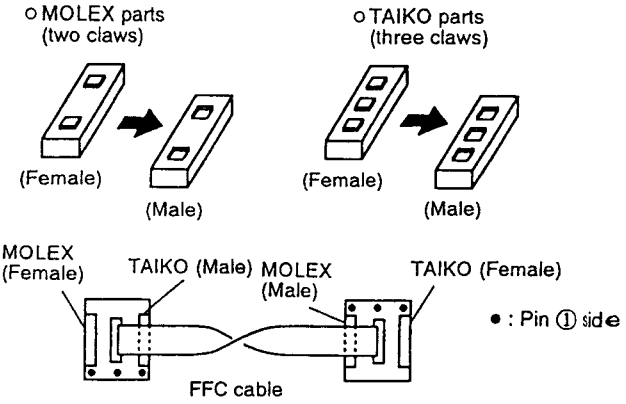


Fig. 7-2-3.

- EXTENSION CABLE USING LOCATION

(See page 7-1 for details of extension cables.)

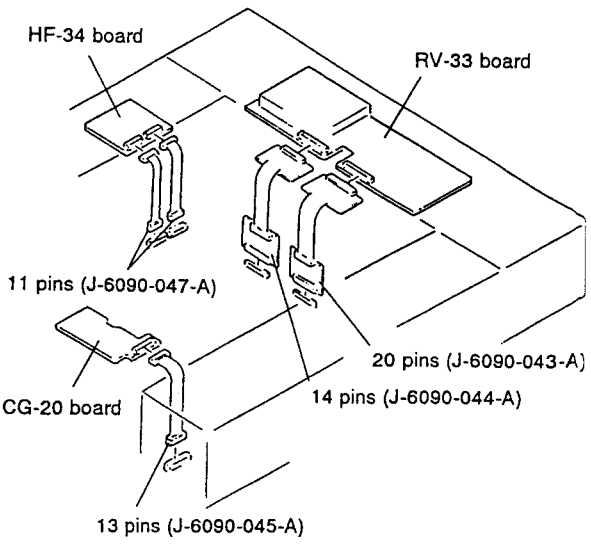


Fig. 7-2-4.

2-3-1. Switching Position Adjustment (MA-181 Board)

Purpose:

Adjust the interval between A ch and B ch of tape playback output.

Improve the interchangeability with other tapes and sets.

When it is out of order, the interval appears on the screen, the screen is disturbed.

Mode	PB
Signal	Alignment tape
Measurement Point	CH1: CJ701 VIDEO LINE OUT (IO-50 board) CH2: Pin ⑳ of CN304 (RF SWP)
Measuring Instrument	Oscilloscope
Adjusting Element	RV202
Specified Value	6.5 ± 0.5 H (416 ± 32 μsec)

Adjusting Method:

1) Adjust the tracking position to the center by pushing tracking buttons [▲], [▼] (on remote commander).
2) Check that switching position is 6.5 ± 0.5 H. (416 ± 32 μsec)
   If not meet the specified value, turn RV202 and repeat steps 1) to 2).

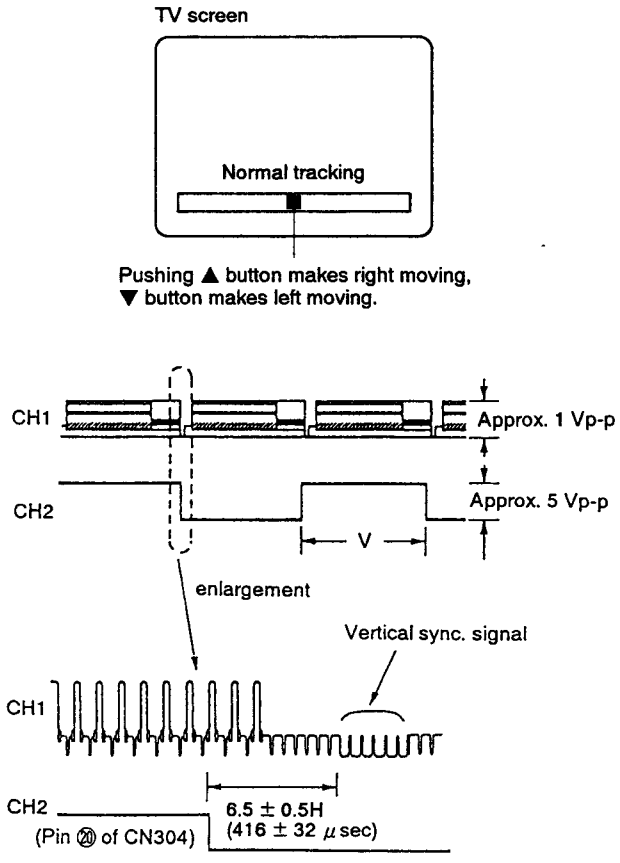


Fig. 7-2-5.

2-3-2. Sync AGC Adjustment (RV-33 Board)

Mode	E-E
Signal	Color bar
Measurement Point	CJ701 VIDEO LINE OUT (IO-50 board)
Measuring Instrument	Oscilloscope
Adjusting Element	RV001
Specified Value	1.00 ± 0.05 Vp-p

Note : VIDEO LINE OUT terminal must be terminates at 75Ω.

Adjusting Method:

1) With RV001, adjust the VIDEO signal level to 1.00 ± 0.05 Vp-p

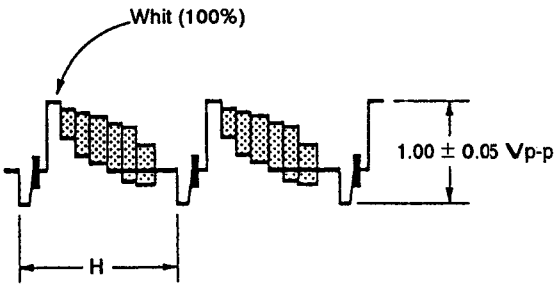


Fig. 7-2-6.

2-3-3. White Clip Adjustment (RV-33 Board)

Purpose:

Adjust the frequency of FM modulated YFM signal doesn't go too high.

When it is out of order, white goes flat and black is over-modulated.

Signal	Color bar
Measurement Point	Pin ㊺ of IC001
Measuring Instrument	Oscilloscope
Adjusting Element	RV004
Specified Value	White clip : 180 ± 5% Dark clip : 50 ± 5%

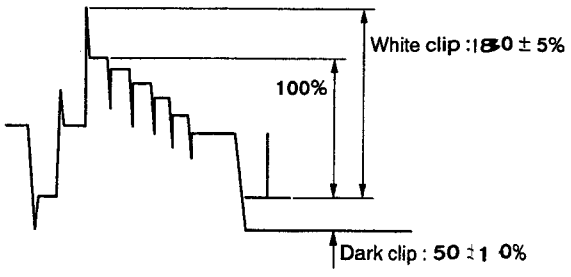


Fig. 7-2-7.

2-3-4. Recording Chroma Adjustment (RV-33 Board)

Purpose:

Adjust recording chroma level.

When it is out of order, S/N ratio of color goes bad, the picture is not colored and second sequence beat appears.

Mode	E-E
Signal	Color bar
Measurement Point	Q013 Emitter
Measuring Instrument	Oscilloscope
Adjusting Element	RV009
Specified Value	130 ± 10 mVp-p

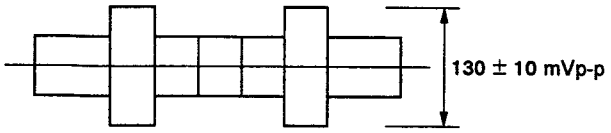


Fig. 7-2-8.

Reference:

Adjusting level is low; Bad color S/N ratio, not colored.

Adjusting level is high; Second sequence beat (squared noise) appears.

2-3-5. Playback Level Adjustment (RV-33 Board)

Purpose:

Adjust playback video signal level to the specification.

When it is out of order, the picture is darkened or brightened on TV screen. White goes flat.

Mode	Playback
Signal	Color bar or alignment tape
Measurement Point	VIDEO LINE OUT
Measuring Instrument	Oscilloscope
Adjusting Element	RV003
Specified Value	1.0 ± 0.02 Vp-p

Note : Video Output terminal must be terminated at 75Ω.

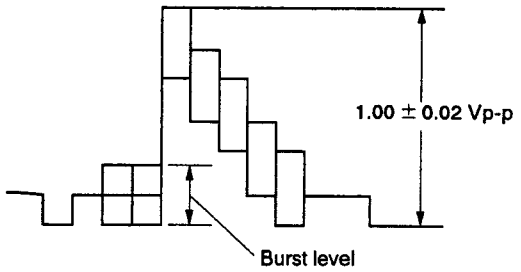


Fig. 7-2-9.

Reference:

Adjusting level is low; The picture is darkened on TV screen.

Adjusting level is high; The picture is brightened on TV screen. White goes flat.

2-3-6. Carrier Deviation Adjustment (RV-33 Board)

Purpose:

Adjust FM modulating frequency for signal.

When it is out of order, black and white are over-modulated, interchangeability is lack, the screen is darkened or brightened or off.

This adjustment should be done after checking 2-3-5. Playback Level Adjustment is satisfied.

Carrier Set	
Mode	E-E
Signal	None
Measurement Point	Emitter of Q034
Measuring Instrument	Frequency Counter
Adjusting Element	RV006
Specifed Value	3.80 ± 0.05 MHz
Deviation	
Mode	REC. PB
Signal	Color bar
Measurement Point	VIDEO LINE OUT
Measuring Instrument	Oscillosope
Adjusting Element	RV005
Specifed Value	1.00 ± 0.02Vp-p

Note : Video Output terminal must be terminated at 75Ω.

Adjusting Method:

1) Set to E-E mode in the no signal condition.
2) Connect frequency counter to emitter of Q034, and adjust with RV006 so that the reading on frequwncy counter goes 3.80 ± 0.05 MHz.
3) Feed the color bar signal and record it.
4) Playback the recorded signal and sheck the signal at VIDEO LINE OUT goes 1.00 ± 2.00 Vp-p with oscilloscope.
5) When it is out of order, adjustment it with RV005.
6) Repeat items 4) and 5) fill the specification is satisfied.

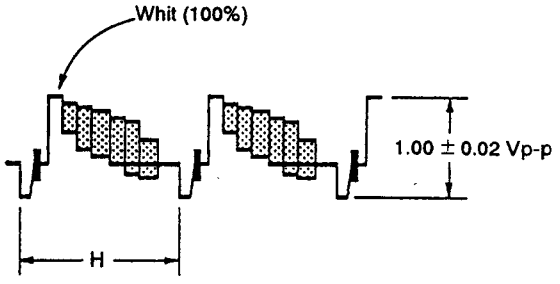


Fig. 7-2-10.

2-3-7. VCO Adjustment (RV-33 Board)

Purpose:

Adjust to lock the color surely.

When it is out of order, the picture doesn't colored.

Mode	PB
Signal	Color bar
Measurement Point	Pin ㊺ of IC001
Measuring Instrument	Digital voltmeter
Adjusting Element	T001
Specified Value	2.5 ± 0.1 Vdc

2-3-8. SECAM Discrimination Adjustment (RV-33 Board) (SLV-E90VC: MESECAM)

Mode	E-E
Signal	SECAM Color bar
Measurement Point	Pin ⑪ of IC201
Measuring Instrument	oscilloscope
Adjusting Element	RV201
Specified Value	4.8 ± 0.1 Vp-p

Adjusting Method:

1) Adjust RV201 so that the amplitude of 1/2 fh waveform becames 4.8 ± 0.1 Vp-p.

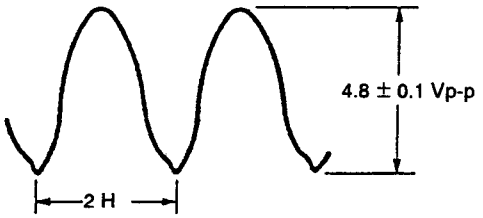


Fig. 7-2-11.

2-4. AUDIO SYSTEM ADJUSTMENTS

- Adjust both Lch and Rch.

[Connection]

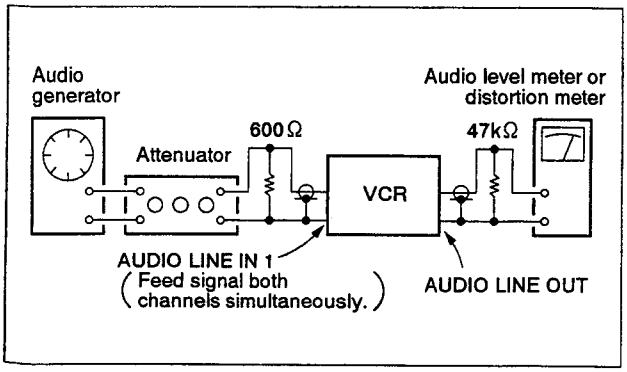


Fig. 7-2-12.

2-4-1. Hi-Fi Audio System Adjustment

- Set switches and knobs to the following positions to make adjustment unless otherwise specified.

  INPUT SELECT switch ····· LINE 1

  AUDIO MONITOR ····· STEREO

[Adjusting Sequence]

1. VCO fo adjustment
2. Deviation check
3. BPF fo adjustment
4. AF switching position

1. VCO fo Adjustment (HF-34 Board)

Purpose:

Adjust to have interchangeability in HiFi audio.

When it is out of order, the sound is distorted.

Mode	REC
Signal	No signal
Measuring Instrument	Frequency counter
1.4 MHz Adjustment	
Measurement Point	Pin ⑲ of IC101
Adjusting Element	RV103 (R CH)
Specified Value	1.4 MHz ± 1 kHz
1.8 MHz Adjustment	
Measurement Point	Pin ㉚ of IC101
Adjusting Element	RV102 (R CH)
Specified Value	1.8 MHz ± 1 kHz

Note: Connect the frequency counter through a probe of high input impedance (more than 1 MΩ) and low capacity (10 pF or less).

Adjusting Method:

1) Connect the frequency counter to each measurement point.
2) Adjust each volume so that each frequency meets its specified value.

2. Deviation Check (HF-34 Board)

Purpose:

Set the HiFi audio signal level to specified value.

Adjust to have interchangeability with other tapes and sets.

When it is out of order, the volume of sound is different on playback.

Mode	REC
Signal	Pins ①, ③ 400 Hz − 12 dBs
Measurement Point	IC101 L CH Pin ⑲ R CH Pin ㉚
Measurement Equipment	Frequency counter
Specified Value	50 ± 5 kHz

3. BPF fo Adjustment (HF-34 Board)

Purpose:

Adjust to separate carrier component precisely and to operate normally the filter for cutting video signal.
When it is out of order, the sound is distorted.

Mode	PB
Signal	1.608 MHz Input 200 mVp-p : Pin ① of CN103
Measurement Point	Pin ⑲ of IC101 Pin ㉚ of IC101
Measuring Instrument	Oscilloscope
Adjusting Element	RV101

Connection:

1) Remove HF-34 board from CN103, and feed 1.608 MHz, 200 mVp-p sine wave to Pin ① of CN103.

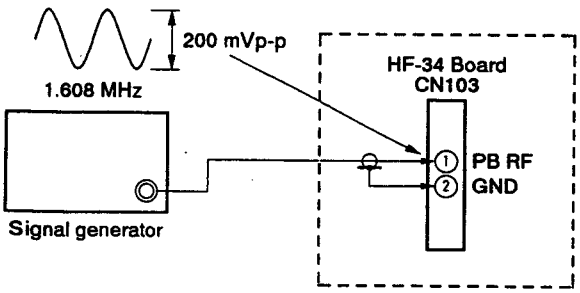


Fig. 7-2-13.

Adjusting method:

1) Turn RV101 counterclockwise seen from the component side.
2) Turn RV101 clockwise gradually and stop turning when the level Ⓐ becomes equal to the level Ⓑ.

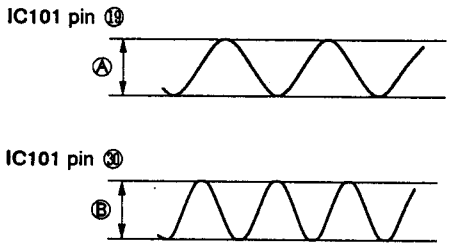


Fig. 7-2-14.

4. AF Switching Position Adjustment (MA-181 Board)

Adjust the interval between A CH and B CH of tape playback output. Improve the interchangeability with other tapes and sets.
When it is out of order, noisy sound is increased and big noise is heard.

Mode	PB
Signal	Alignment tape
Measurement Point	CH1: See Fig. 7-2-15 (HF-34 Board) CH2: Pin ③ of CN802 (RV-33 Board)
Measuring Instrument	Oscilloscope
Adjusting Element	RV201
Specified Value	Fig. 7-2-16

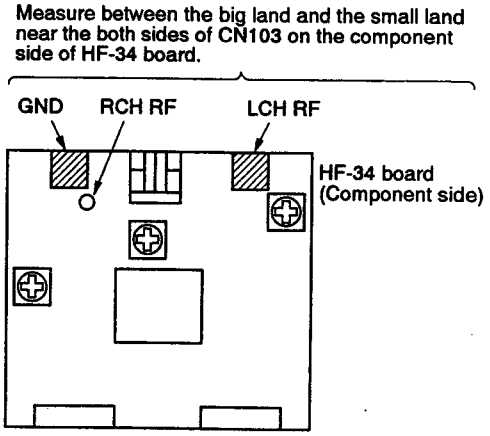


Fig. 7-2-15.

Adjusting method:

1) Adjust the tracking position to the center by pushing tracking buttons ▲, ▼ (on remote commander). (Auto tracking: OFF)
2) Adjust RV201 to minimize dropout.

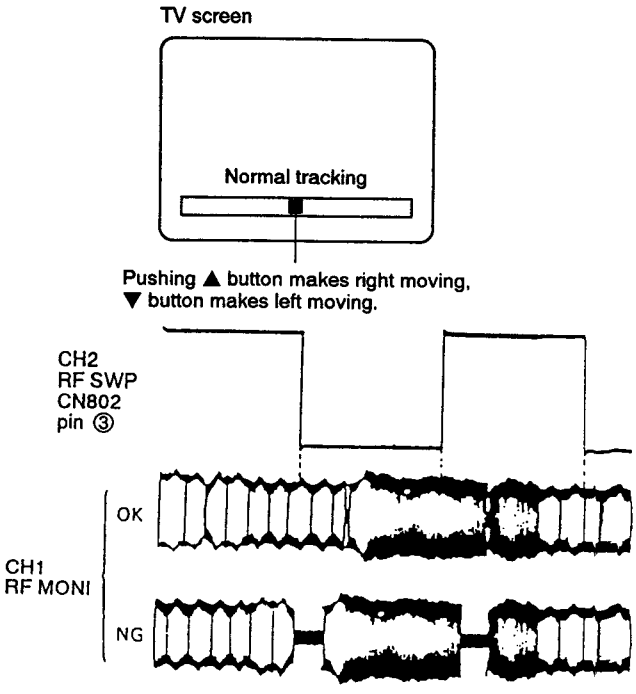


Fig. 7-2-16.

2-4-2. Normal Audio System Adjustment

- Make adjustment in the SP mode, unless otherwise specified. Use a normal VHS cassette for an adjustment tape.
- Set AUDIO MONITOR to normal.

1. ACE Head Adjustment

Refer to the service manual of VHS MECHANICAL ADJUSTMENT II.

2. Recording Bias Adjustment (MA-181 Board)

Mode	REC and PB
Signal	400 Hz, − 30 dBs 7 kHz, − 60 dBs
Measurement Point	AUDIO LINE OUT L or R
Measuring Instrument	Audio level meter
Adjusting Element	RV851
Specified Value	0 ± 1 dB

Adjusting Method:

1) Supply a signal of 400Hz, − 30 dBs to Audio Line Input.
2) Connect the audio level meter to the Audio Line Output.
3) Adjust the attenuator so that the audio level meter will indicate − 30 dBs.
4) Make recording in the SP mode.
5) Set an audio line input signal to 7 kHz and make recording.
6) Playback a recorded portion, and measure output levels at 400 Hz and 7 kHz.
7) Confirm that the 7 kHz playback output levels within a range of the 400 Hz playback output level 0 ± 1 dB. When beyond this range, adjust RV851 and repeat the steps 1) through 7) above.

2-5. TUNER SYSTEM ADJUSTMENT

2-5-1. Receive Separation Adjustment (E90ES/NC/NP/UX: TU-146 Board) (E90AP/IT/VC: PT-96 Board))

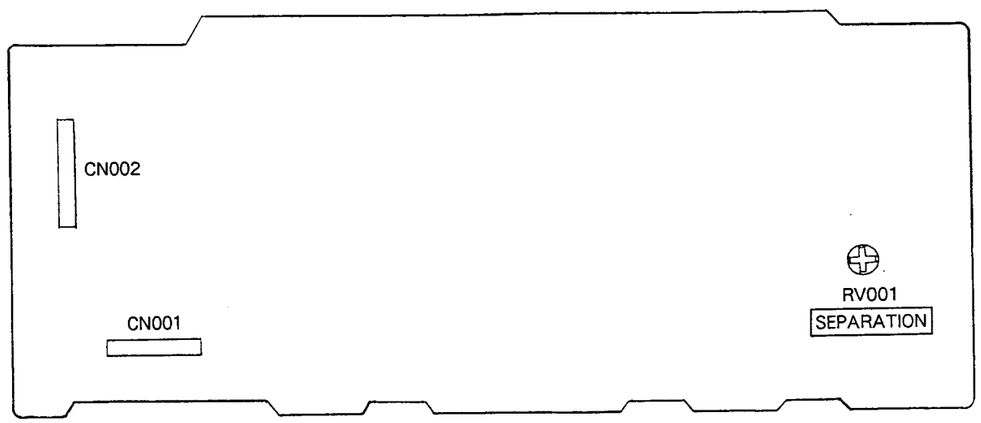
Signal	Stereo Lch: No modulation Rch: 1 kHz Modulation: 100%
Connection Point	AUDIO LINE OUT L
Measuring Instrument	Oscilloscope
Adjusting Element	RV001 (TU-146 board) RV871 (PT-96 board)

Adjusting Method:

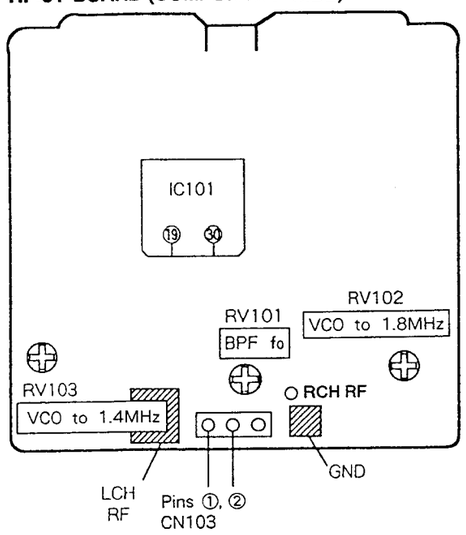
1) Set the sound multiplex signal generator in the Stereo mode, and set Lch to 400 Hz and Rch to 1 kHz, 100% modulation.
2) Connect the oscilloscope to the Lch of Audio Line Output.
3) Adjust RV001 (RV871) to minimize Rch (1 kHz) output. When this is done, do not fully turn RV001 (RV871). (The "STEREO" indication must be illuminated.)

2-6. PARTS ARRANGEMENT DIAGRAM FOR ADJUSTMENTS

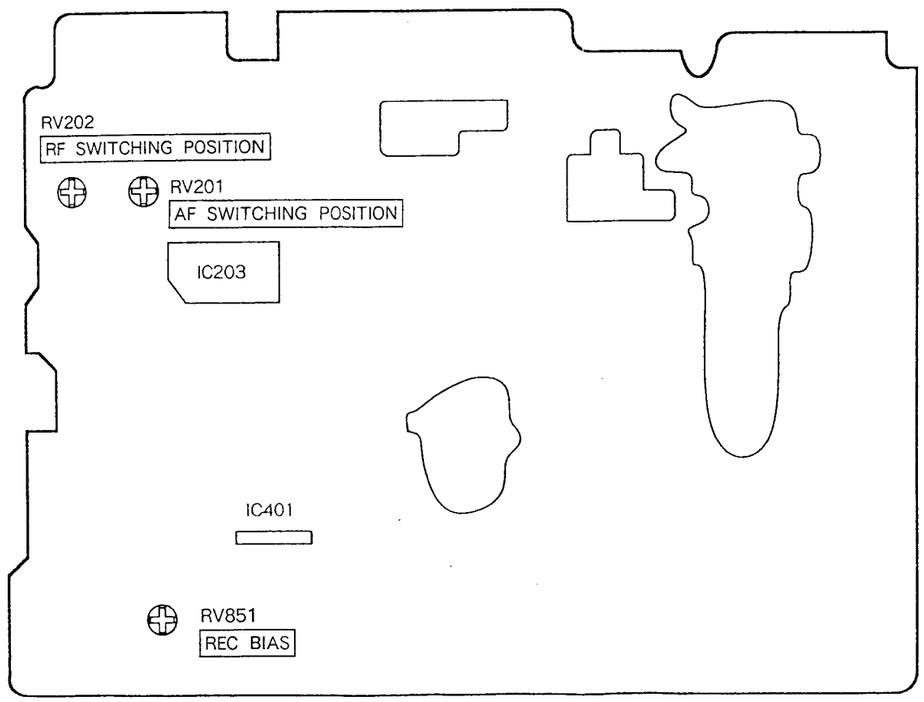
TU-146 BOARD (CONDUCTOR SIDE)



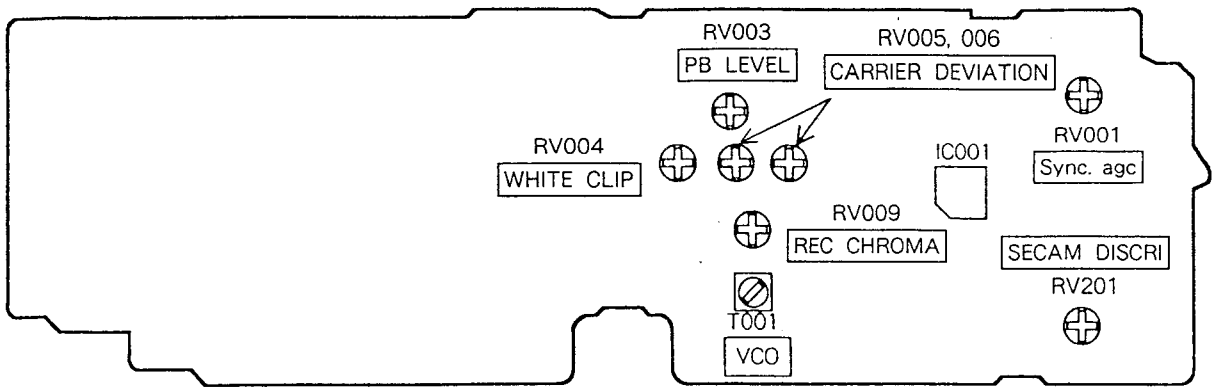
HF-34 BOARD (COMPONENT SIDE)



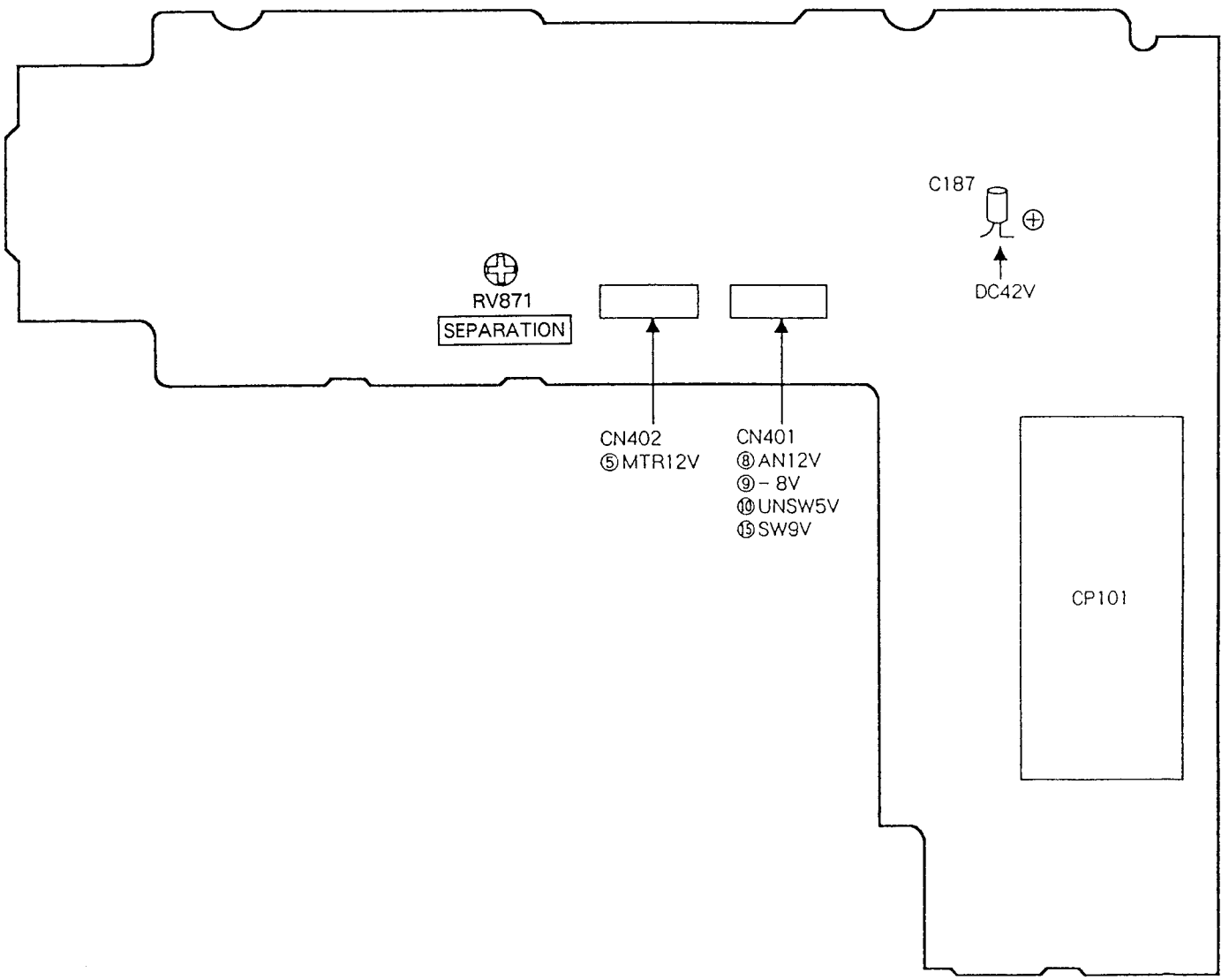
MA-181 BOARD (CONDUCTOR SIDE)



RV-33 BOARD (COMPONENT SIDE)



PT-96 BOARD (CONDUCTOR SIDE)



VM1801

SLV-E90AP/IT/NC/NP/UX/VC

RMT-V141/V142/V146C

SONY

SERVICE MANUAL

AEP Model
SLV-E90AP
Italian Model
SLV-E90IT
North European Model
SLV-E90NC
Spanish Model
SLV-E90NP
UK Model
SLV-E90UX
German Model
SLV-E90VC

CORRECTION-1

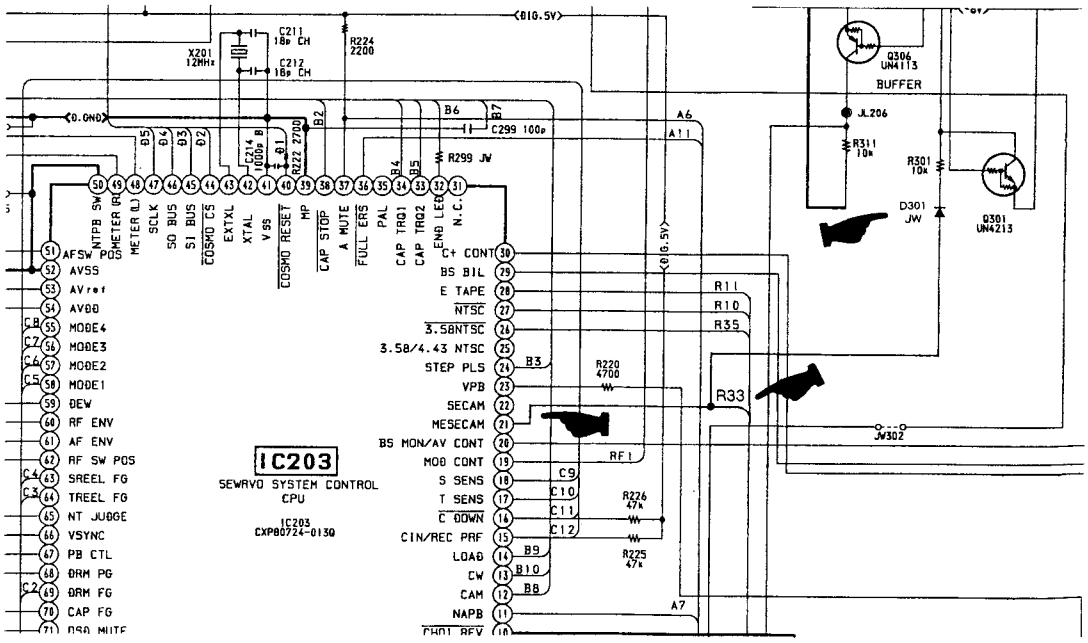
Please correct your service manual.

☛ : **Corrected position.**

1. PRINTED WIRING BOARDS AND SCHEMATIC DIAGRAM

Page 4-17

- **Location: C-18 to E-21**



2. EXPLODED VIEWS

Page	Ref. No.	Description	Part No.	
			Incorrect	Correct
5-5	208	TABLE ASSY, REEL	X-3727-789-1	X-3727-798-1

3. ADJUSTMENTS

Page 7-3

2-3-3. White Clip Adjustment (RV-33 Board)

Purpose:

Adjust the frequency of FM modulated YFM signal doesn't go too high.

When it is out of order, white goes flat and black is over-modulated.

Model	E-E
Signal	Color bar
Measurement Point	Pin ㊺ of IC001
Measuring Instrument	Oscilloscope
Adjusting Element	RV004
Specified Value	White clip :180 ± 5% Dark clip :50 ± 10%

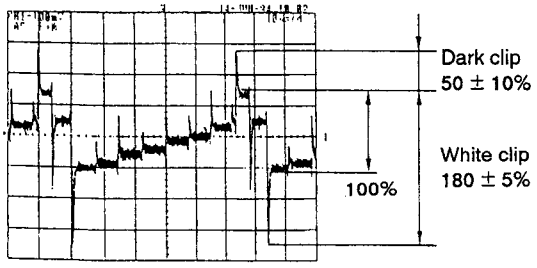


Fig. 7-2-7

Page 7-4

Adjusting Method:

1) Set to E-E mode in the no signal condition.
2) Connect frequency counter to emitter of Q034, and adjust with RV006 so that the reading on frequency counter goes 3.80 ± 0.05 MHz.
3) Feed the color bar signal and record it.
4) Playback the recorded signal and check the signal at VIDEO LINE OUT goes 1.00 ± 0.02 Vp-p with oscilloscope.
5) When it is out of order, adjust it with RV005.
6) Repeat items 4) and 5) fill the specification is satisfied.

English
94K0569-1
Printed in Japan

9-973-565-91

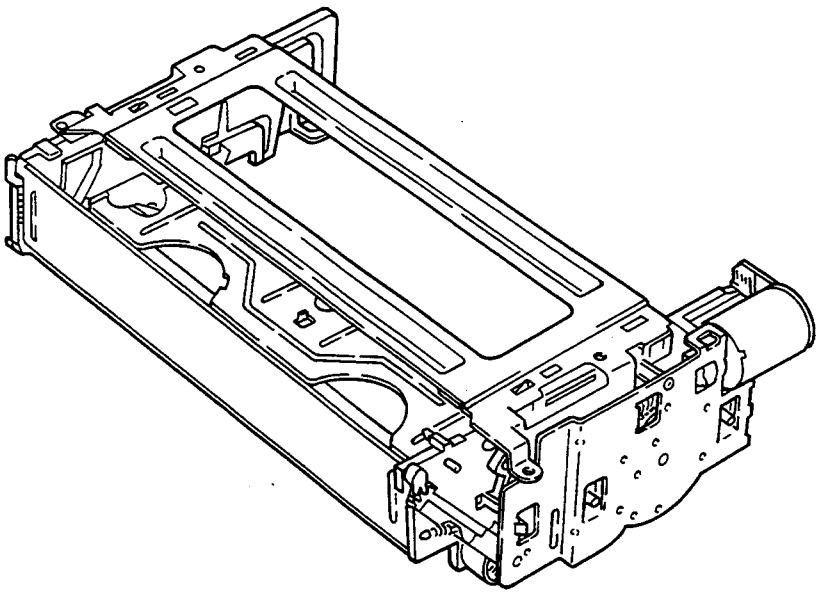
Sony Corporation
Consumer A&V Products Company
Home A&V Products Div.

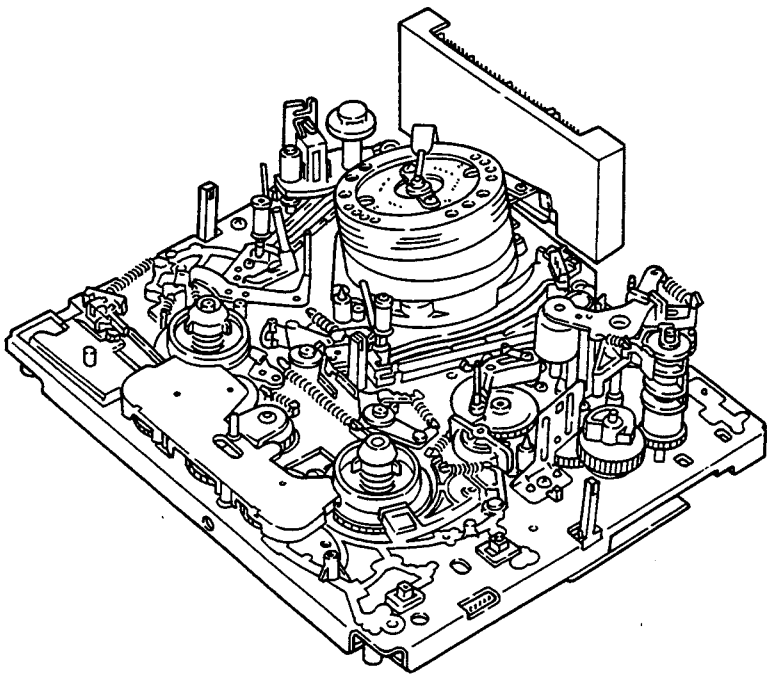
Published by Personal A&V Products Div.
Quality Engineering Dept.

VIDE-V12926

VHS MECHANICAL ADJUSTMENT MANUAL II

- Please use in conjunction with the SERVICE MANUAL.
- This VHS MECHANICAL ADJUSTMENT MANUAL II can be used for NTSC system and PAL system.





MICROFILM

VHS VIDEO RECORDER

SONY®

TABLE OF CONTENTS

1. PREPARATIONS FOR CHECKS, ADJUSTMENTS AND REPLACEMENT OF THE DECK MECHANISM

Note : Refer to "Replacement Method" in the Service Guide for instructions on replacing the cabinet and PC boards. DO not perform cassette loading or threading with the VCR positioned upside-down.

1-1. LOADING AND UNLOADING VIDEO CASSETTES WITH THE POWER OFF. (Fig. 1-1.)

1-1-1. Manual loading and unloading

1) Rotate the loading motor in the direction of arrow Ⓐ until loading is compleated.
(When unloading, rotate the loading motor in the direction of arrowⒷ.)

1-1-2. Loading and unloading using a separate power source.

1) Cassette loading is performed by applying approx. 10V (300 mA) to the power terminal of the loading motor using a stabilized DC power source.
(When unloading, apply the same voltage to the opposite polarity of the power terminal.)

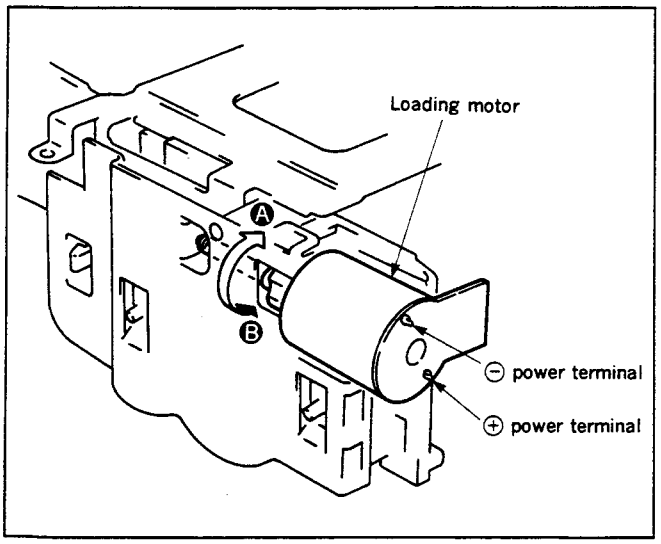


Fig. 1-1.

1-2. THREADING AND UNTHREADING WITH THE POWER OFF. (Fig. 1-2)

1-2-1. Manual threading and unthreading

1) Rotate the cam motor ❶ in the direction of arrowⒶuntil threading is completed.
(When unthreading, rotate the cam motor ❶ in the direction of arrowⒷ.)

1-2-2. Threading and unthreading using a separate power source.

1) Threading is performed by applying approx. 10V (500 mA) to the power terminal for the cam motor ❶ using a DC stabilized power source.
(When unthreading, apply the same voltage to the opposite polarity of the power terminal.)

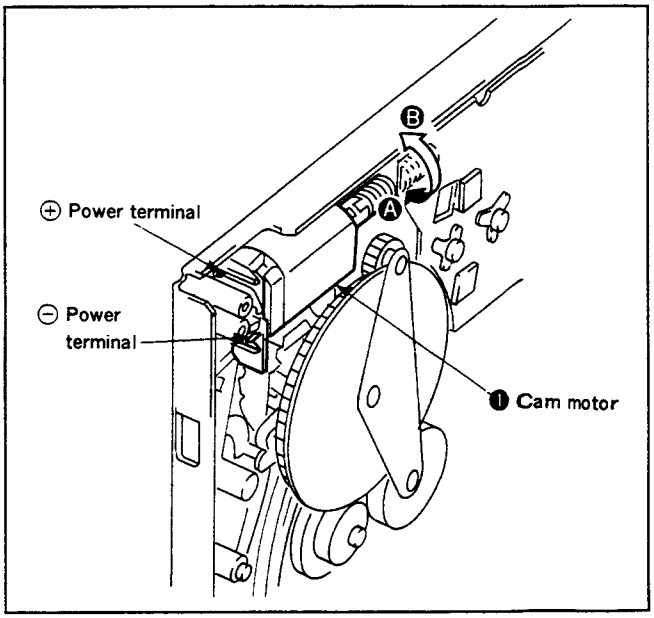


Fig. 1-2.

1-3. TO COMPLETE THREADING WITH THE FL CASSETTE CONTROLLER REMOVED. (Fig. 1-3)

1) Unplug the AC power cord from the power outlet.
2) Shield the supply, take-up sensors and the LED with black-masking tape.
3) Hold the cassatte down switch depressed by taping it, etc.
4) Plug the AC power cord into a power outlet.
   (At this time, the power should turn on and the tape rewinds for approx. 10 seconds, and the power turns off.)
5) Turn the power switch ON so that the mechanism is ready for loading.

Note : In this condition, the VTR is ready to operate in the different operating modes, including the record mode. At this time, rewind the tape for at least 15 seconds, then perform fast forward (FF).

Note : Following the above, be sure to reset the mechanism to the previous state as outlined below.

1) Remove the black-masking tape shielding the supply and take-up sensors, the LED and the tape holding cassette down switch.
2) Unplug the AC power cord from the power outlet to reset the system control microprocessor.

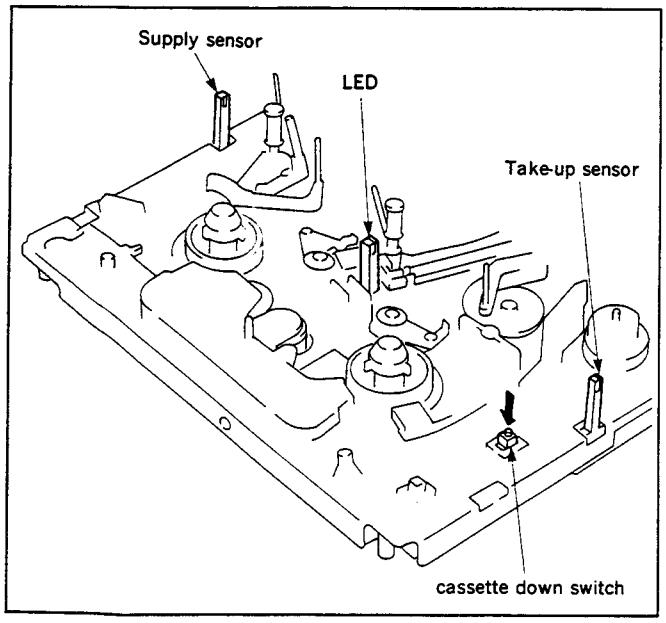


Fig. 1-3.

2. PERIODICAL INSPECTION AND REPLACEMENT

We recommend performing the following periodical inspections and maintenance in order to ensure that the unit operates in top condition and offers full performance, as well as realizes a long life of the mechanism and tapes.

* Be sure to perform the following maintenance procedures after the unit is repaired (regardless how long the unit has been used.)

2-1. CLEANING THE ROTARY HEAD DISC ASS'Y

1) Press Attach a deer skin cloth (Jig. Ref. No. J-7) soaked in cleaning solution (Jig. Ref. No. J-5) lightly to the rotary drum ass'y, then turn the rotary head disc slowly by hand to clean the surface of the rotary drum ass'y. (At this time, do not turn on the power motor to rotate the rotary head disc for cleaning.)
2) Also, do not wipe the drum ass'y by moving the deer skin cloth vertically across the head as this could damage of the tip of the head.

2-2. CLEANING THE TAPE TRANSPORT SYSTEM

1) Clean the tape transport surfaces (tape guide, a drum ass'y surfaces, capstan, pinch roller, etc.) with a deer skin cloth soaked in an approved in the recommended cleaning solution.

2-3. CLEANING THE DRIVE SYSTEM

1) Wipe the drive mechanism with an ordinary cloth soaked in an approved cleaning solution.

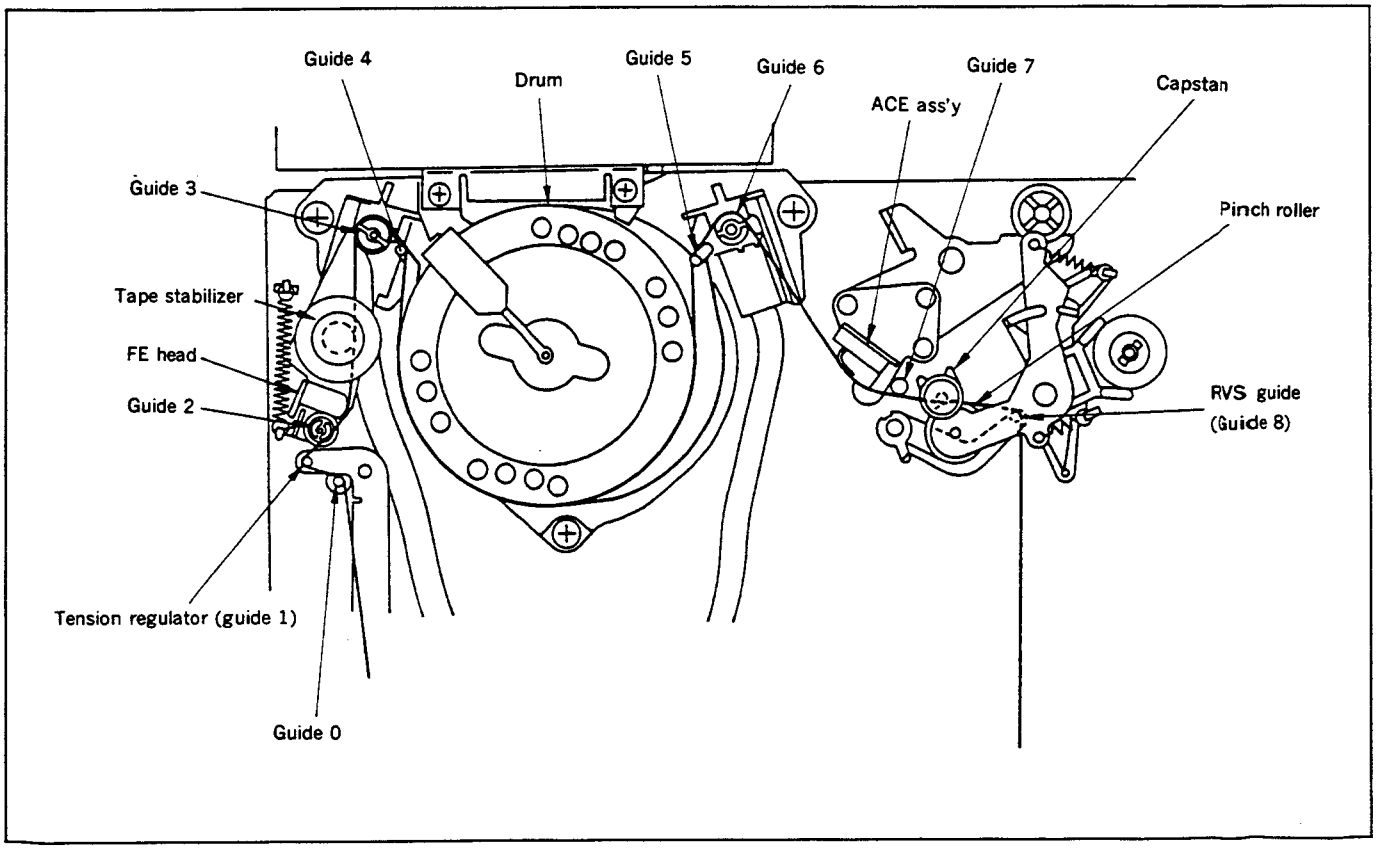


Fig. 2-1.

2-4. PERIODIC MAINTENANCE

Location of Maintenance and Check		User Hours / Replacement Part No.	500	1,000	1,500	2,000	2,500	3,000	3,500	4,000	4,500	5,000	Remarks
Performance Check	Clean tape running surfaces	——	○	○	○	○	○	○	○	○	○	○	Always perform after repair.
	Clean, degauss ACE ass'y	——	○	○	○	○	○	○	○	○	○	○	
	Clean, degauss video disc ass'y	——	○	○	○	○	○	○	○	○	○	○	Head life is greatly affected by environment and method of use.
Driving System	Reel belt	3-736-013-01	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	Always perform after repair.
Tape Running System	Abnormal noise	——	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	Adjust or replace source of abnormal noise.
	Back tension measurement	——	–	☆	–	☆	–	☆	–	☆	–	☆	Check according to 4-1-1. Spec : 24 — 34g/cm (Measured with torque cassette)
	Brake system check	——	–	☆	–	☆	–	☆	–	☆	–	☆	
	REC/PB function check	——	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	Always perform after repair.
	Forward torque measurement		☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	Spec : 80 — 140 g·cm

○ Cleaning ☆ Check

Note : Refer to the above items for part replacement when performing an overhaul.

2-5. SERVICE TOOLS AND JIGS

Ref. No.	Description	Part No.	Printing on jig	Remarks
J-1	Master plane	H-7099-279-H		
J-2	Reel disc height jig	H-7099-038-H		
J-3	Torque gauge adapter	H-7099-035-H		
J-4	Torque gauge	H-7099-039-H		
J-5	0.93mm Allen wrench	H-7099-202-H		
J-6	NTSC torque cassette VHT-063S PAL torque cassette	J-6082-011-A J-6082-066-A		For rewind torque and back tension
	NTSC torque cassette VHT-404S PAL torque cassette	J-6082-012-A J-6082-067-A		For cue/review
J-7	NTSC alignment tape JVC-MH-1 PAL alignment tape JVC-MH-2	H-7099-046-H H-7099-052-H		
	NTSC Hi-Fi alignment tape PAL Hi-Fi alignment tape	H-7099-153-H H-7099-175-H		
J-8	Cleaning fluid	Y-2031-001-0	———	
J-9	Chamois cloth	2-034-697-00	———	Cleaning
J-10	Head degausser	Widely available	———	Video, audio head degaussing
J-11	Small adjustment mirror (with handle) Small adjustment mirror (mirror only)	J-6080-029-A J-6080-030-1	SL-5052	For tape path and tape running adjustment and check

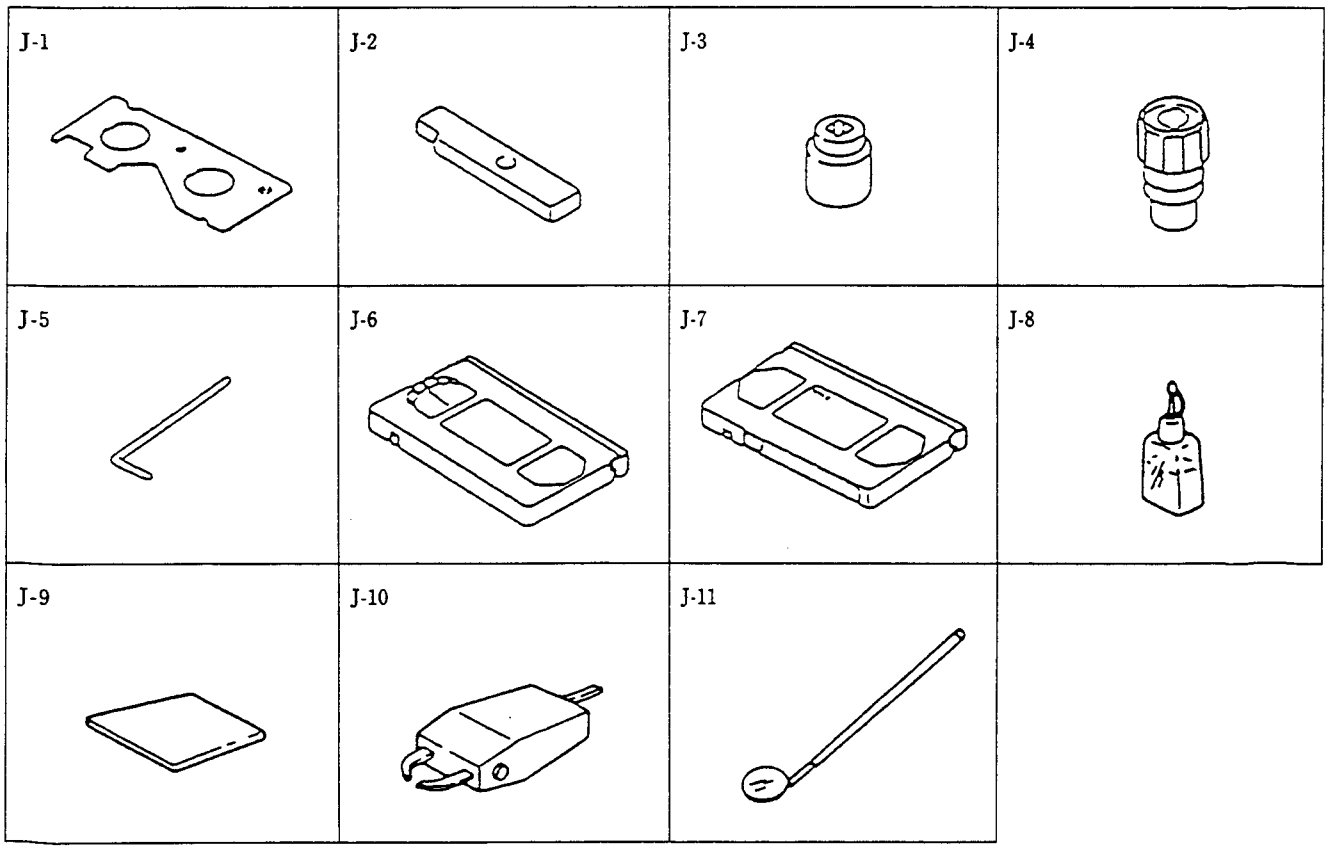


Fig. 2-2. Service tools and jigs

3. REPLACEMENT OF MAJOR COMPONENT PARTS OF THE DECK MECHANISM

Note: ○ Refer to "Replacement Method" in the Service Guide for replacing the cabinet and PC boards.
○ When mounting parts, reverse the replacement procedure while referring to "Precautions on Mounting Parts".

3-1. FL MECHANISM

3-1-1. FL door (Fig. 3-1.)

1) Press the claw ❶ in the direction of arrow Ⓐ, then remove the FL door ❷ in the direction of arrow Ⓑ.

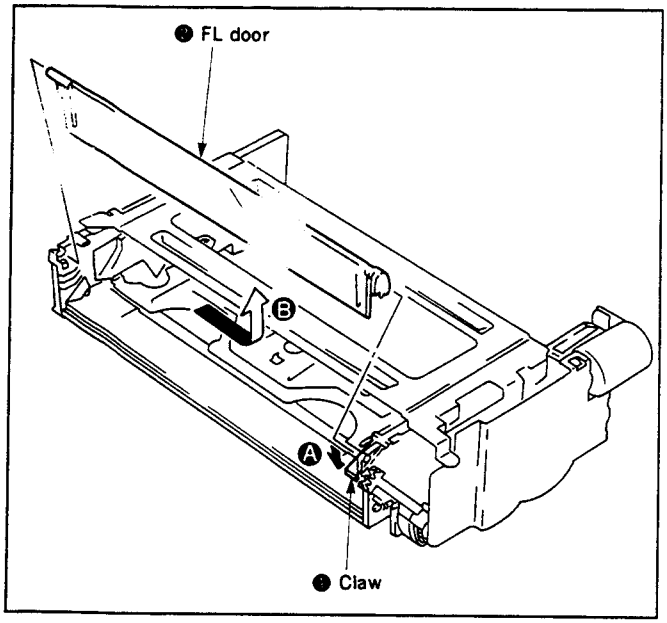


Fig. 3-1.

3-1-2. Erasure protection lever (Fig. 3-2)

1) Remove the spring ❶.
2) Disengage the claw ❷, then slide the erasure protection lever ❸ in the direction of arrow Ⓐ.
3) Disengage the erasure protection lever ❸ in the direction of arrow Ⓑ.

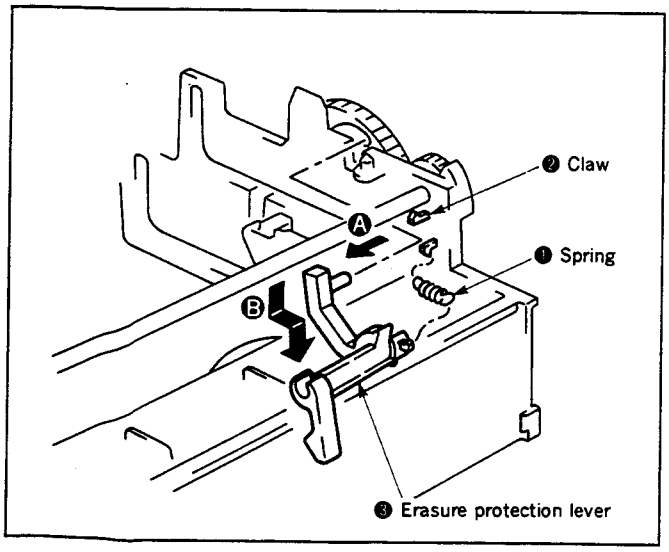


Fig. 3-2.

○ After grease coated parts such as gears are replaced, re-grease the replaced part.
○ Do not touch the guides (taped surface) and brake shoe directly with your fingers or grease them, etc.
○ Gears must be mounted so that they mesh with each other.

3-1-3. Gear cover ass'y (Fig. 3-3)

1) Disengage the four claws ❶, then remove the gear cover ass'y ❷.

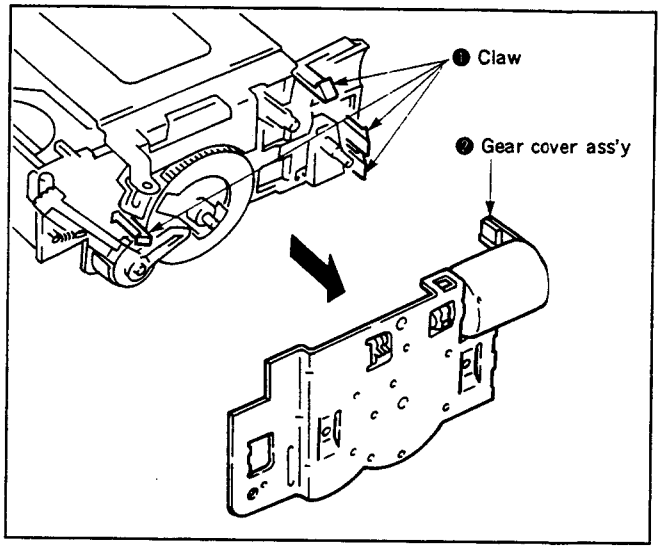


Fig. 3-3.

3-1-4. Loading motor, worm gear (FL), worm wheel (FL), worm bearing (Fig. 3-4)

1) Remove washer 3 ❶, then pull out the worm wheel (FL) ❷.
2) Remove the two screws ❸, then remove the loading motor ❹.
3) Remove the worm gear (FL) ❺ and worm bearing ❻.

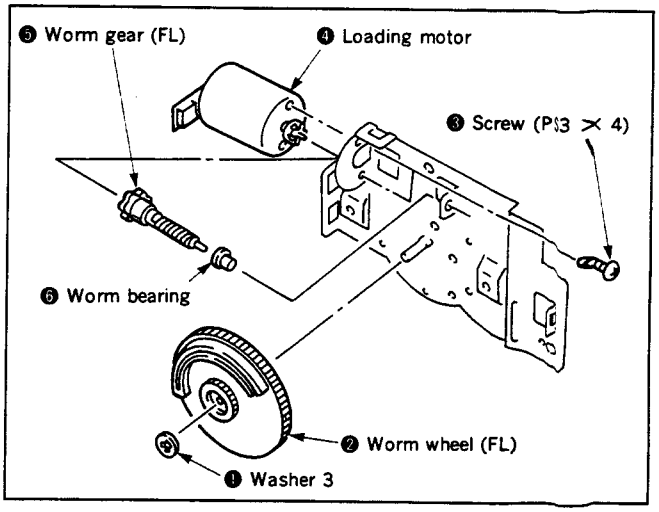


Fig. 3-4.

3-1-5. Door OPEN/CLOSE arm (Fig. 3-5)

1) Remove the spring ❶.
2) Pull out the door OPEN/CLOSE arm ❷.

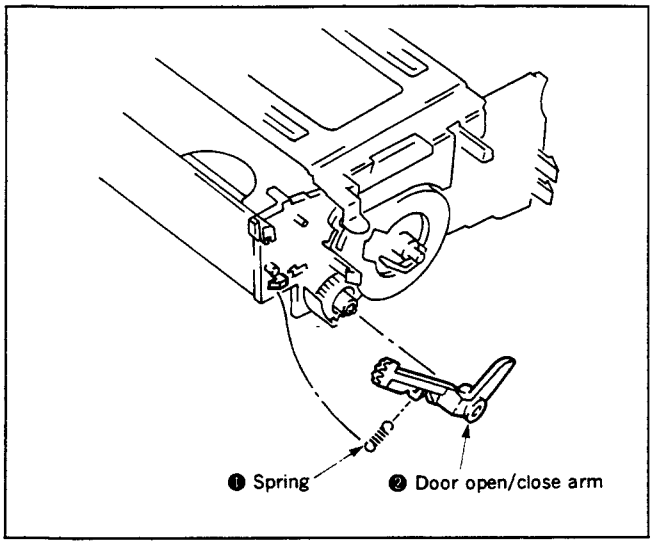


Fig. 3-5.

[Precautions on remounting] (Figs. 3-6 and 3-7.)

- When mounting the gear cover ass'y, match up the two holes on the gear cover ass'y with the two holes on the worm wheel (FL) and then with the hole on the right drive arm ass'y.
- Mesh the FL door and the door OPEN/CLOSE arm together as shown in Ⓐ section in the figure below.
- The erasure protection lever shaft must fit into the groove on the left drive arm ass'y.

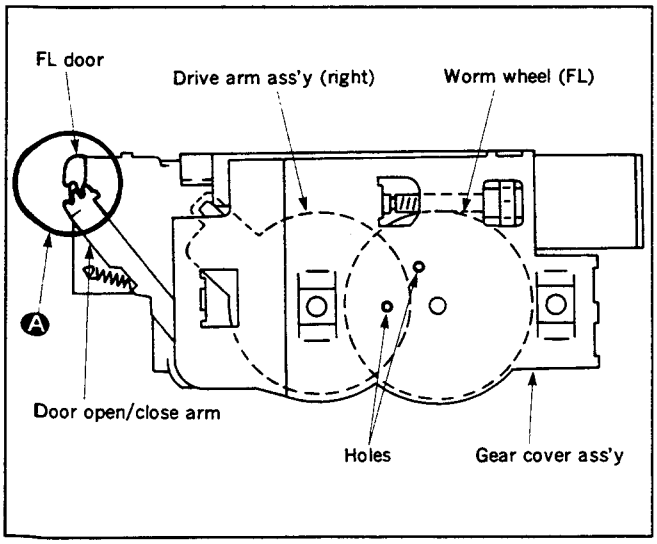


Fig. 3-6.

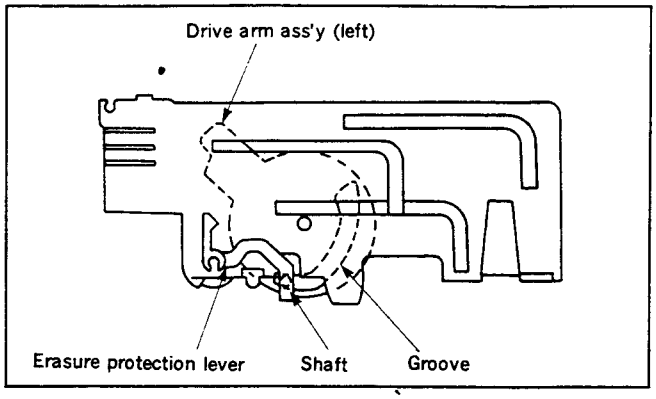


Fig. 3-7.

3-2. TS ASS'Y AND GUIDE ROLLER ASS'Y No. 2 (Fig. 3-8)

1) Remove the spring ❶.
2) Remove the TS ass'y ❷ in the direction of arrow Ⓐ.
3) Turn guide roller ass'y No. 2 ❸ in the direction of arrow Ⓑ and pull it out.

[Precautions on remounting]

- Clean the surface of guide roller No. 2 ❸ where the tape is attached.
- Apply lubricant over the section shown in Figure A below.

[Adjustment after replacement]

- Perform tape path adjustments as described in 4-1.

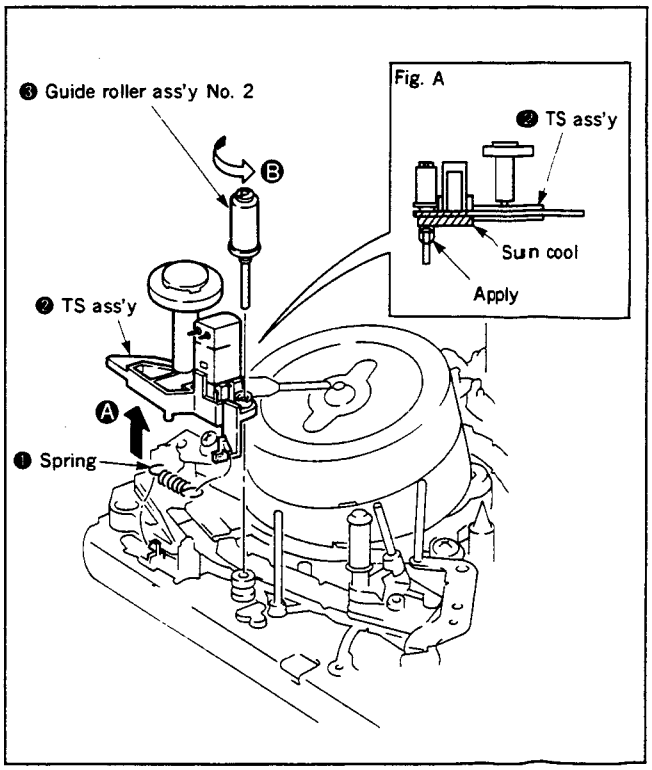


Fig. 3-8.

3-3. ACE ASS'Y (Fig. 3-9)

1) Slide the torsion coil spring ❶ in the direction of the arrow.
2) Remove the nylon nut N3 ❷, then pull out the ACE ass'y ❸.
3) Remove the ACE adjuster screw ❹.

[Precautions on remounting]

○ Clean the surface of the ACE ass'y ❸ where the tape is attached.
○ Hook both ends of the torsion coil spring ❶ to the ass'y as shown in Figure A below.
○ Adjust the ACE adjuster screw ❹ to the height shown in Figure A.

[Adjustment after replacement]

○ Perform tape path adjustments as described in 4-1.

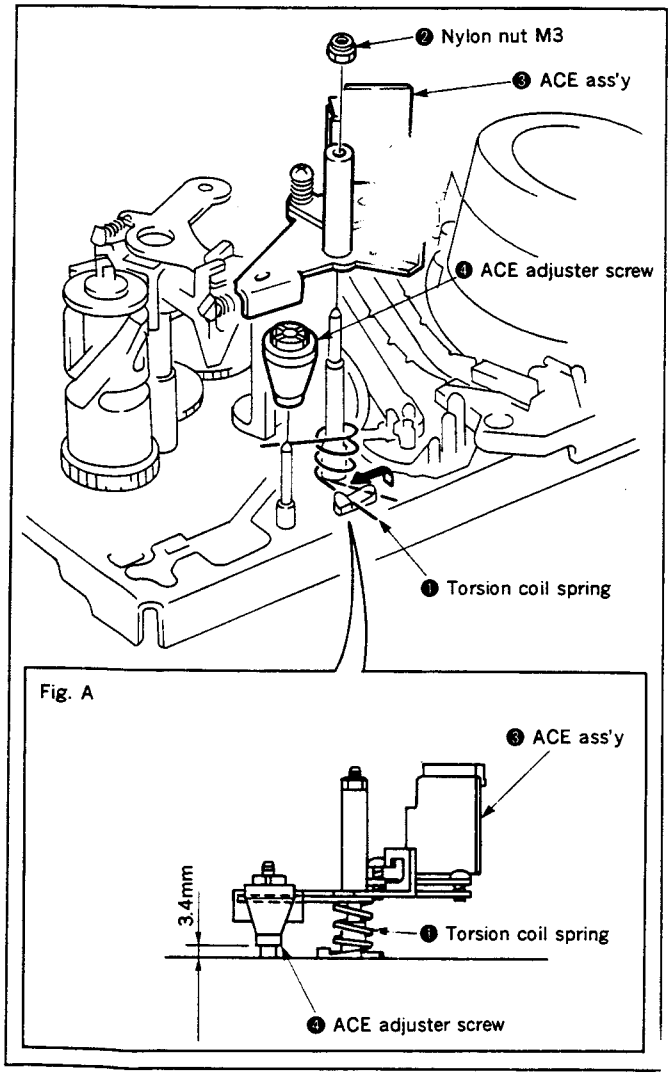


Fig. 3-9.

3-4. DRUM ASS'Y (Fig. 3-10)

1) Remove the three screws ❶, then remove the drum ass'y ❷.

[Precautions on remounting]

○ Do not touch the head tips ❸ and the ground plate ❹ directly with your fingers or tools.
○ Clean the surface of the drum ass'y ❷ where a tape is attached.
○ The stopper ❺ must be attached at the point shown in the figure below
○ Screws must be fastened with a 6kg•cm (±1kg•cm) screw fastening torque. (The screws can be mounted in any order.)

[Adjustment after replacement]

○ Perform tape path adjustments as described in 4-1.

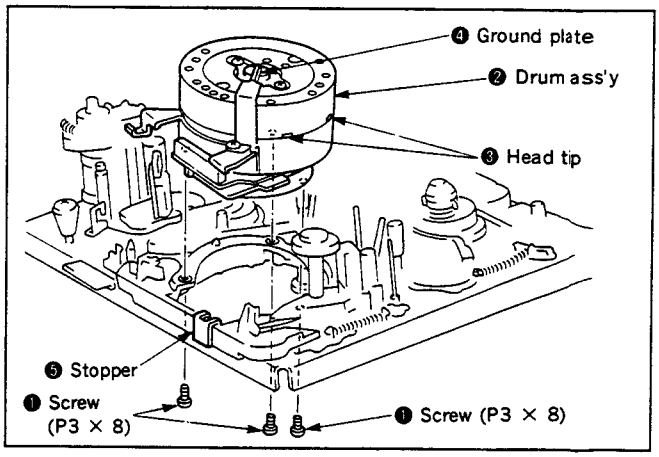


Fig. 3-10.

3-5. DRUM BASE ASS'Y (Fig. 3-11)

1) Remove the drum. (Refer to 3-4.)
2) Remove the three screws ❶, then remove the drum base ass'y ❷.

[Precautions on remounting]

○ The spacer ❸ for the drum base must be mounted in its previous position as shown in the figure below.
[Note that some units do not feature the spacer ❸.]
○ Fastening torque must be 10kg•cm (±1kg•cm)
○ The screws must be mounted in order of (a),(b) and (c).

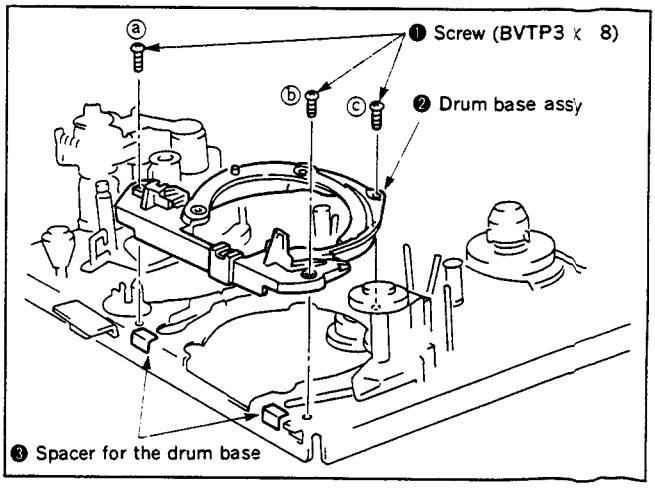


Fig. 3-11.

3-6. PINCH ROLLER ASS'Y AND ELEVATOR CAM (Fig. 3-12)

1) Remove the two claws ❶, then pull out the stopper ❷.
2) Pull out the pinch roller ass'y ❸.
3) Pull out the elevator cam ❹.

[Precautions on remounting]

○ Clean the surface of the pinch roller ass'y ❸ where the tape is attached.
○ Match up the ▯ marks on the elevator cam ❹ and cam gear, press ❺.

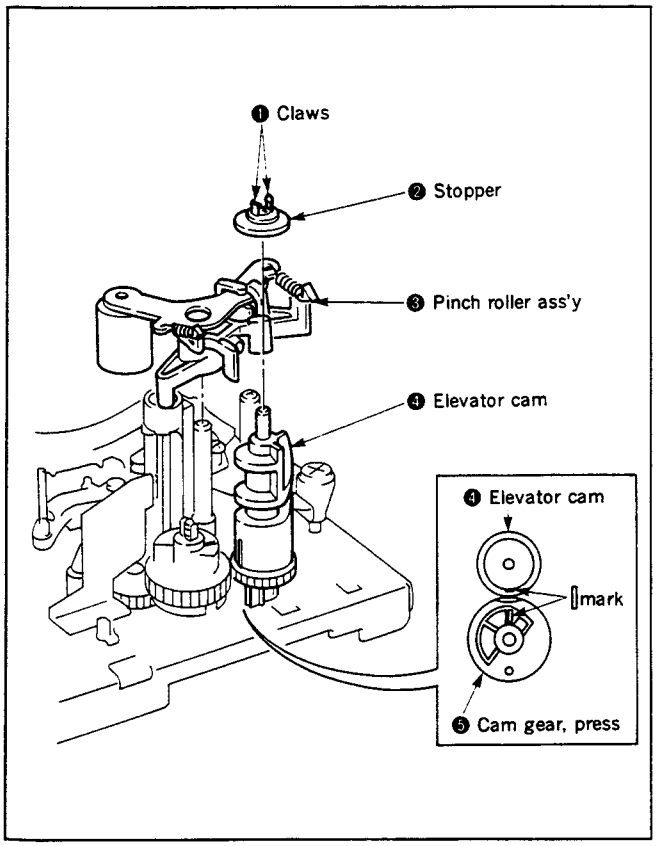


Fig. 3-12.

3-7. CAM GEAR, PRESS AND TRANSMISSION GEAR (Fig. 3-13)

1) Remove the pinch roller ass'y. (Refer to 3-6.)
2) Remove the screw ❶, then remove the lid release plate ❷.
3) Remove the two claws ❸, then pull out the cam gear, press ❹.
4) Remove the washer 2 ❺, then pull out the transmission gear ❻.

[Precautions on remounting]

○ Check the top and bottom of the transmission gear ❻.
○ Match up the hole ❼ on the chassis with the hole ❼ on the cam gear, press ❹.
○ Match up the ▯ mark on the cam gear, press ❹ with the ▯ mark on the alleviator cam ❽.

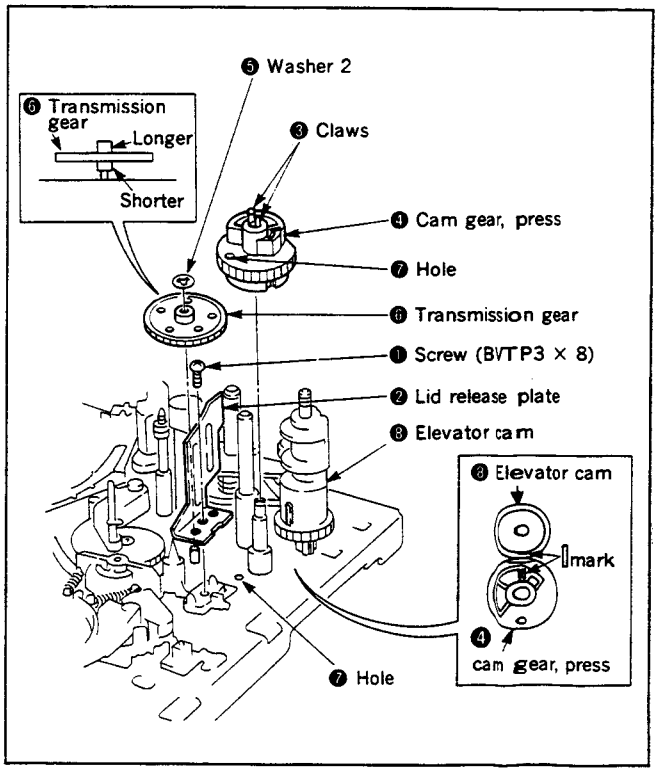


Fig. 3-13.

3-8. RVS ARM ASS'Y AND RVS CAM GEAR (Fig. 3-14)

1) Remove the nylon nut M2 ❶ and plastic washer ❷.
2) Disengage the claw ❸, then pull out the RVS arm ass'y ❹.
3) Remove washer 2 ❺, then pull out the RVS cam gear ❻.

[Precautions on remounting]

- The holes ❼ in the chassis and in the RVS cam gear ❻ must match up. Also, make sure to match up the holes ❾ on the cam gear, press ❽ and the chassis.
- The spring ❿ must be hooked as shown in Fig. A below.
- Clean the surface of the RVS arm ass'y ❹ where a tape is attached.
- Apply 1/2 drop of lubricant to the shaft ⓫.

[Adjustment after replacement]

- Perform tape path adjustments as described in 4-1.

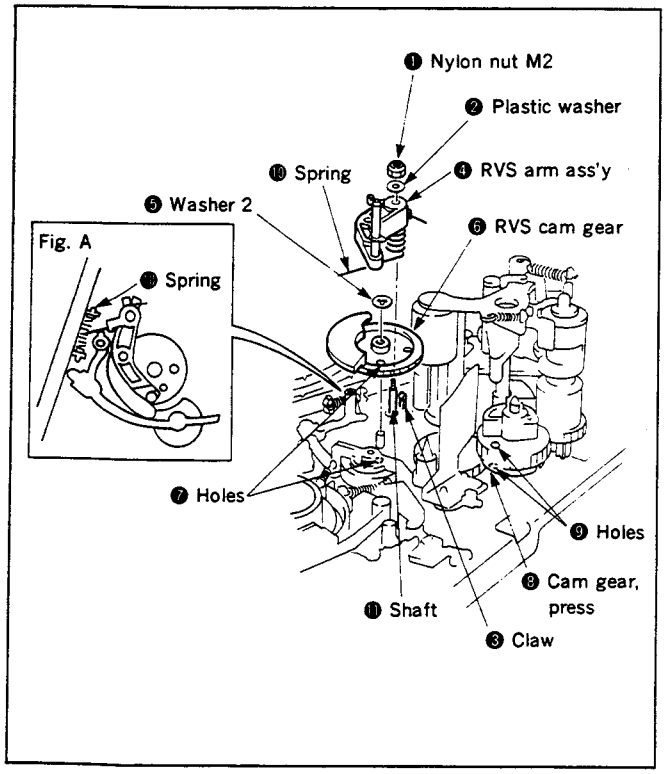


Fig. 3-14.

3-9. GUIDE No. 7 (Fig. 3-15)

1) Remove the nylon nut M3 ❶.
2) Pull out guide flange No. 7 ❷, guide sleeve No. 7 ❸, guide flange No. 7 ❹ and compression coil spring ❺ in the given order.

[Precautions on remounting]

- Clean the surface of the guide sleeve No. 7 ❸ where the tape is attached.
- Adjust the height of guide No. 7 to the height shown in Fig. A below.

[Adjustment after replacement]

- Perform tape path adjustments as described in 4-1.

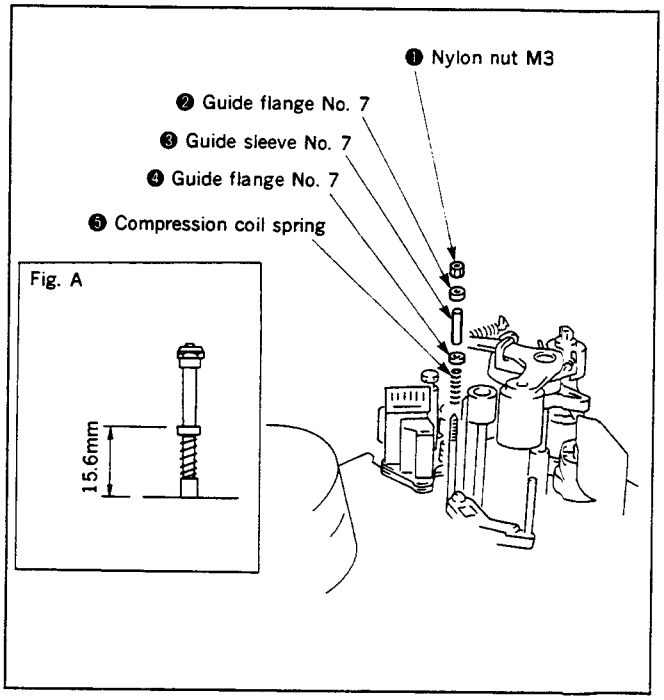


Fig. 3-15.

3-10. S-BRAKE ASS'Y, T-BRAKE ASS'Y (Fig. 3-16)

1) Remove the spring ❶.
2) Disengage the claw ❷, then pull out the S-brake ass'y ❸.
3) Disengage the claw ❹, then pull out the T-brake ass'y ❺.

[Precautions on remounting]

- ○ Do not touch the brake shoes for the respective S-brake ❸ and T-brake ❺ assy's directly with your fingers.
- ○ Do not hold on to the S-brake ❸ and T-brake ❺ assy's by the arms when inserting them.
- ○ The T-brake ass'y ❺ must be positioned above the S-brake ass'y ❸ as shown in Fig. A below.

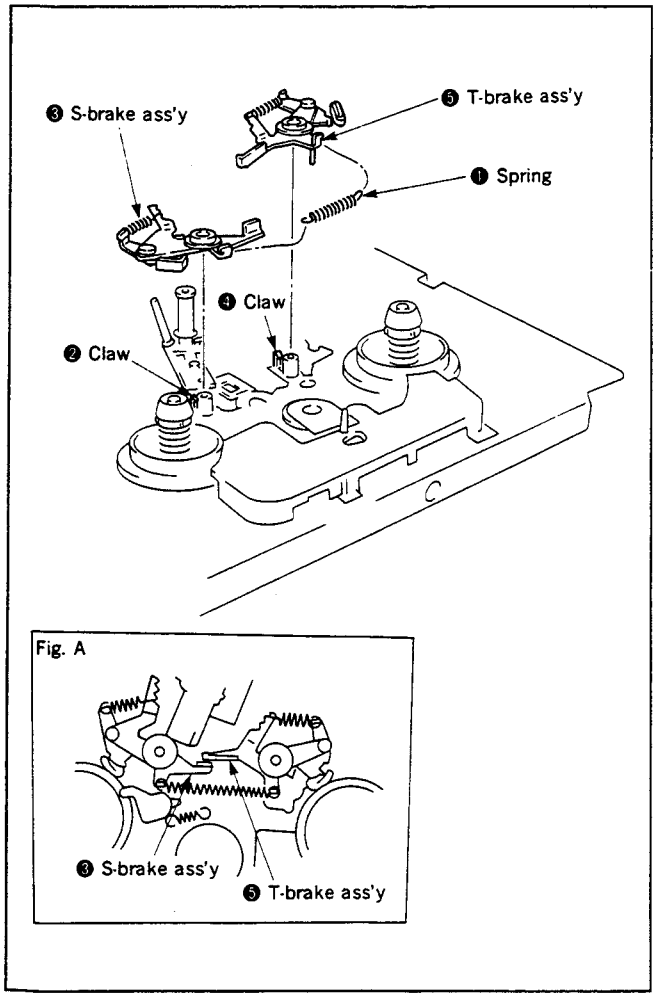


Fig. 3-16.

3-11. T-SOFT BRAKE ASS'Y REV BRAKE ARM (Fig. 3-17)

1) Remove the end of the spring ❶ from the REV brake arm ❷.
2) Remove the end of the spring ❸ from the chassis.
3) Disengage the claw ❹, then pull out the T-soft brake ass'y ❺.
4) Disengage the claw ❻, then pull out the REV brake arm ❷.

[Precautions on remounting]

- ○ Do not touch the brake shoe of the T-soft brake ass'y ❺ directly with your fingers.

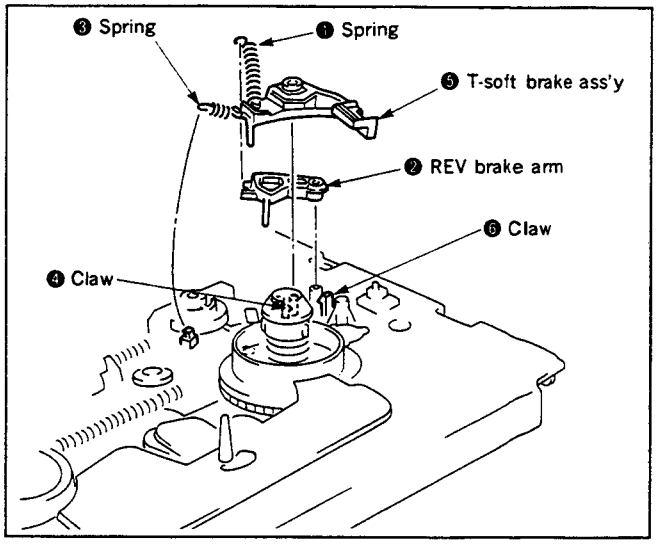


Fig. 3-17.

3-12. S-SOFT BRAKE ARM ASS'Y (Fig. 3-18)

1) Unhook the end of the spring ❶ from the chassis.
2) Disengage the claw ❷, then pull out the S-soft brake arm ass'y ❸.

[Precautions on remounting]

- ○ The S-soft brake arm ass'y must not clamp down the tension regulator band ass'y ❹ nor be positioned below the tension regulator band ❹.

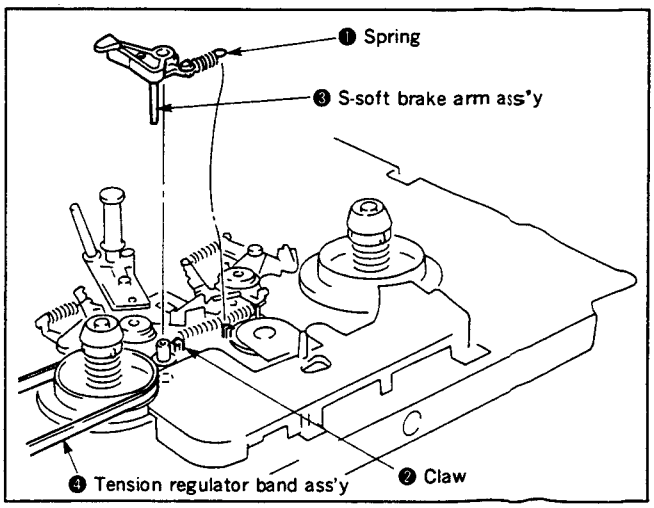


Fig. 3-18.

3-13. S-GUIDE AND T-GUIDE ROLLER ASSY'S (Fig. 3-19)

1) Loosen the setscrew ❶, then remove the S-guide roller ass'y ❷ by turning it in the direction of the arrow Ⓐ.
2) Loosen the setscrew ❸, then remove the T-guide roller ass'y ❹ by turning it in the direction of arrow Ⓑ.

[Precautions on remounting]

○ Clean the surfaces of the S-guide roller ❷ and T-guide roller assy's ❹ where a tape is attached.

[Adjustment after replacement]

○ Perform tape path adjustments as described in 4-1.

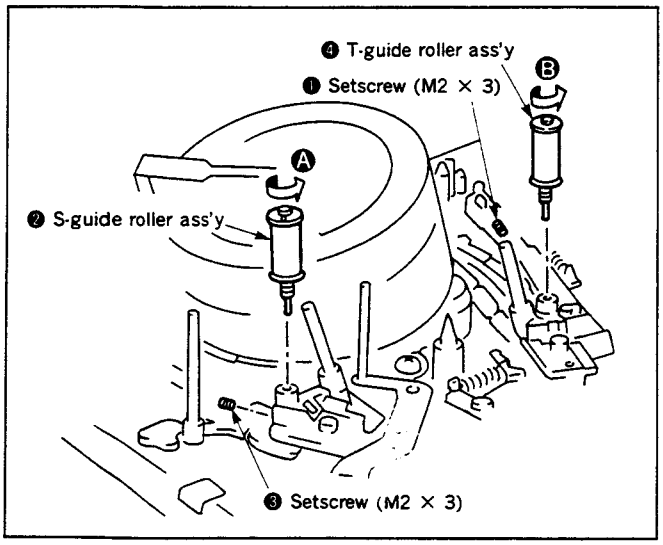


Fig. 3-19.

3-14. REEL LOCK RELEASE AND REW GEAR (Fig. 3-20)

1) Disengage the two claws ❶, then remove the reel lock release ❷ along with the spring ❸ (while the spring is still attached).
2) Next, pull out the REW gear ❹ with the spring bearing ❺ still attached).

[Precautions on remounting]

○ Make sure that the small thrust bearing ❻ remains attached.
○ Make sure that the two claws ❶ lock the real lock release ❷ in place.
○ Apply 1/2 drop of lubricant to the shaft ❼.
○ Make sure that the spring ❸ adheres to the reel lock release ❷ and that it fits inside the rib of the REW gear ❹.
○ Mount the REW gear ❹ by meshing it with gear ❽.

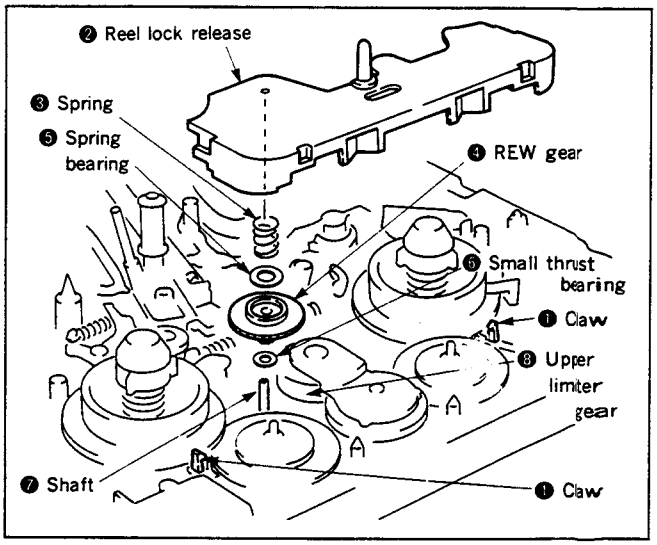


Fig. 3-20.

3-15. TENSION REGULATOR ARM ASS'Y, TENSION REGULATOR BAND ASS'Y (Fig. 3-21)

1) Remove the reel lock release ass'y. (Refer to Fig. 3-14.)
2) Disengage the three claws marked ❶ and the claw marked ❷, then remove the tension regulator band ass'y ❸.
3) Unhook the end of the spring ❹ from the chassis.
4) Disengage the claw ❺, then pull out the tension regulator arm ass'y ❻.

[Precautions on remounting]

- ○ Roll up the tension regulator band ❸ on the S-reel by turning the S-soft brake arm ass'y ❼ in the direction of the arrow.
- ○ Hook the spring ❹ at the center of the spring hook ❽.
- ○ Do not touch the brake shoe of the tension regulator band ass'y ❸ directly with your fingers.
- ○ Mount the tension regulator arm ass'y ❻ at the position shown in Fig. A below.

[Adjustment after replacement]

- ○ Check the back tension. (Refer to 4-1-1.)
- ○ Perform tape path adjustments as described in 4-1.

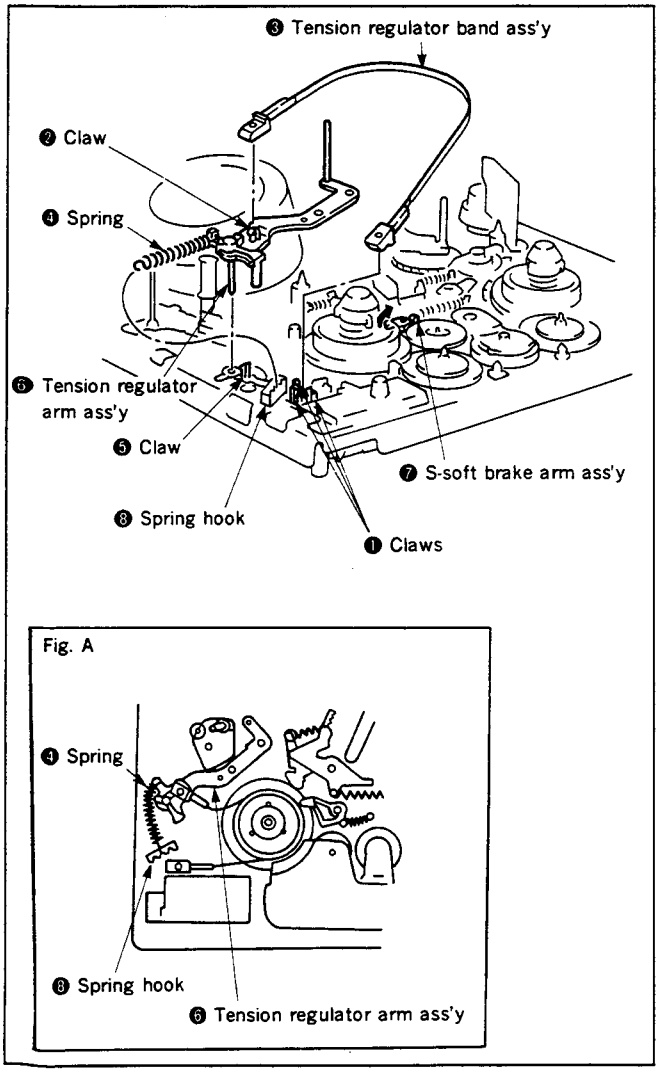


Fig. 3-21.

3-16. S TAKE-UP ASS'Y (Fig. 3-22)

1) Remove the tension regulator arm ass'y and the tension regulator band ass'y. (Refer to 3-15.)
2) Unhook the end of the spring ❶ from the S take-up arm ❷.
3) Disengage the two claws ❸, then remove the S take-up ass'y ❹.

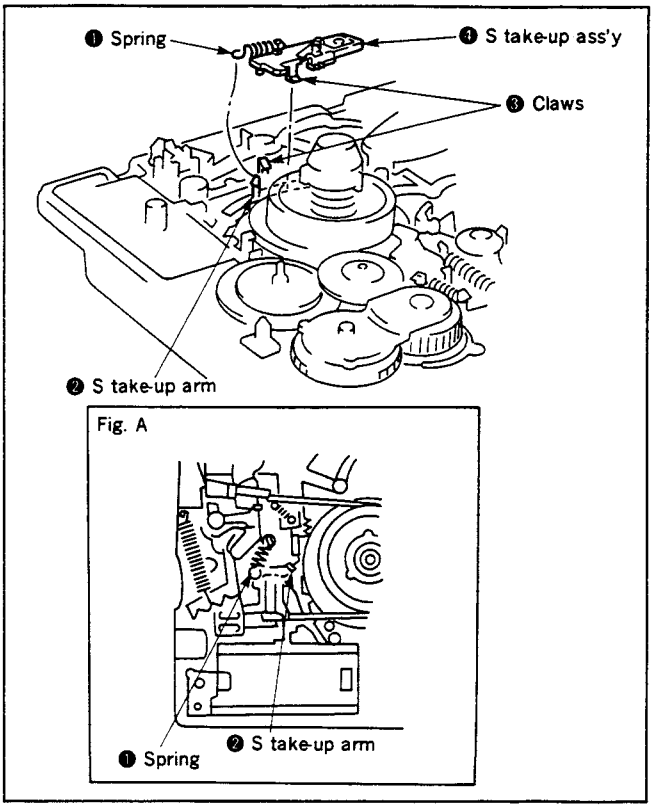


Fig. 3-22.

3-17. S-REEL ASS'Y (Fig. 3-23)

1) Remove the S-soft brake arm ass'y. (Refer to 3-12.)
2) Remove the reel lock release. (Refer to 3-14.)
3) Remove the tension regulator band ass'y. (Refer to 3- 15.)
4) Turn the S-brake ass'y ❶ in the direction of the arrow.
5) Pull out the S-reel ass'y ❷.

[Precautions on remounting]

- ○ At least one reel stand thrust bearing ❸ must be attached (but not more than two).
- ○ Do not touch the outer edge of the S-reel ass'y ❷ directly with your fingers.
- ○ Apply 1/2 drop of lubricant over the shaft ❹.
- ○ Mount the S-reel ass'y ❷ while meshing it with the relay gear ❺.

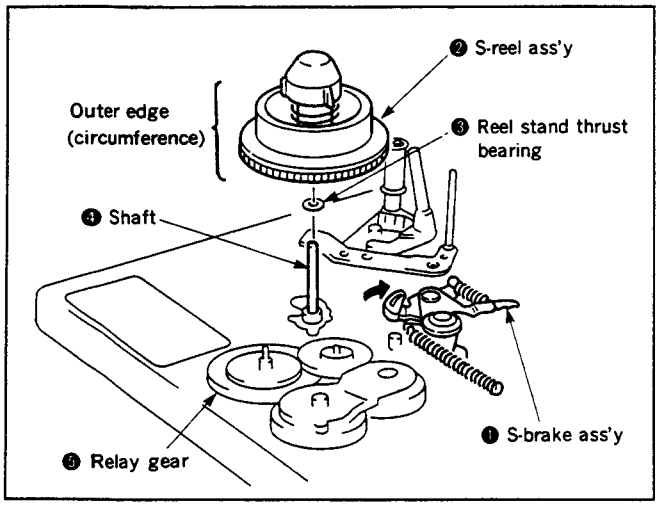


Fig. 3-23.

3-18. T-REEL ASS'Y (Fig. 3-24)

1) Remove the T-soft brake ass'y. (Refer to 3-11.)
2) Remove the reel lock release ass'y. (Refer to 3-14.)
3) Turn the T-brake ass'y ❶ in the direction of the arrow.
4) Pull out the T-reel ass'y ❷.

[Precautions on remounting]

- ○ At least one reel stand thrust bearing ❸ must be attached (but not more than two).
- ○ Do not touch the outer edge of the T-reel ass'y ❷ directly with your fingers.
- ○ Apply 1/2 drop of lubricant on the shaft ❹.
- ○ Mount the T-reel ass'y ❷ while meshing it with the relay gear ❺.

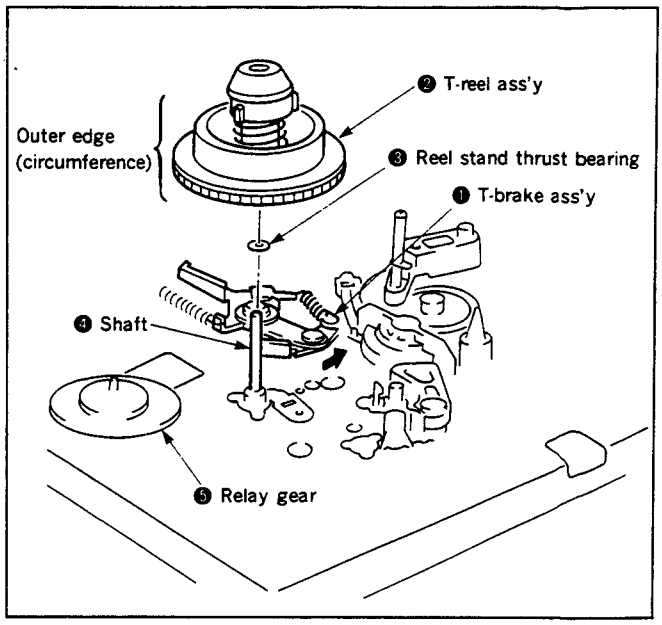


Fig. 3-24.

3-19. PENDULUM ARM ASS'Y (Fig. 3-25)

1) Remove the reel lock release ass'y. (Refer to 3-14.)
2) Remove the washer 2 ❶, then pull out the pendulum arm ass'y ❷.

[Precautions on remounting]

- ○ Fit the boss on the pendulum cap ❸ into the gap in the pendulum slide plate ❹.
- ○ The plastic slider ❺ must be attached.
- ○ Apply 1/2 drop of lubricant on the shaft ❻.
- ○ Mount the pendulum arm ass'y ❷ by meshing it with the upper limiter gear ❼.

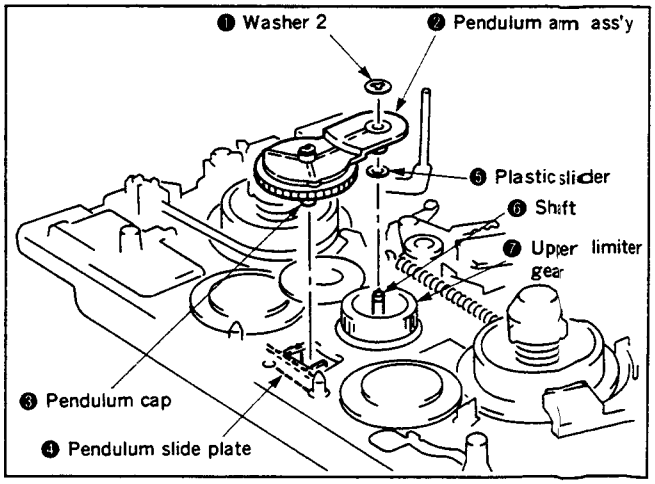


Fig. 3-25.

3-20. RELAY GEAR (Fig. 3-26)

1) Remove the reel lock release and REW gear. (Refer to 3-14.)
2) Remove the S-reel ass'y. (Refer to 3-17.)
3) Remove the T-reel ass'y. (Refer to 3-18).
4) Pull out the two relay gears ❶.

[Precautions on remounting]

○ The relay gears ❶ must rotate smoothly after remounting.
○ Apply 1/2 drop of lubricant to the respective shafts ❷.

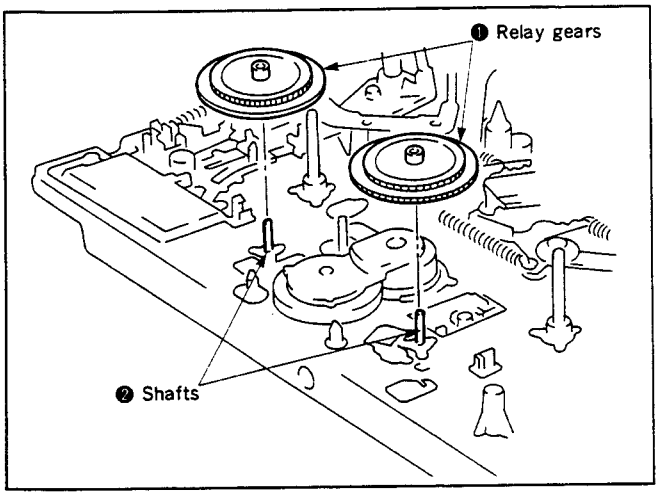


Fig. 3-26.

3-21. ADJUSTER ARM ASS'Y (Fig. 3-27)

1) Remove screw ❶.
2) Remove washer ❻.
3) Remove the end of the spring ❷ hooked to the chassis.
4) Remove the end of the timing belt ❸ from the capstan motor arm ass'y.
5) Disengage the claw ❹, then remove the adjuster arm ass'y.

[Precautions on remounting]

○ First mount the adjuster arm ass'y ❺, timing belt ❸ and spring ❷, then attach the washer ❻ and fasten the screw ❶.
○ The screw fastening torque must be within 5kg•cm (±1kg•cm).

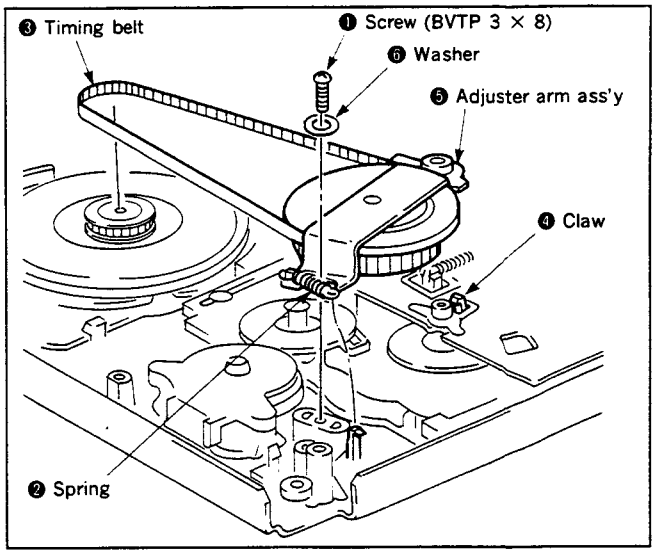


Fig. 3-27.

3-22. CAP BRAKE ASS'Y (Fig. 3-28)

1) Loosen the screw ❶, then push the timing belt ❷ in the direction of the arrow.
2) Unhook the end of the spring ❸ from the chassis.
3) Disengage claw ❹, then pull out CAP brake ass'y ❺.

[Precautions on remounting]

○ Do not touch the brake shoe of the CAP brake ass'y ❺ directly with your fingers.

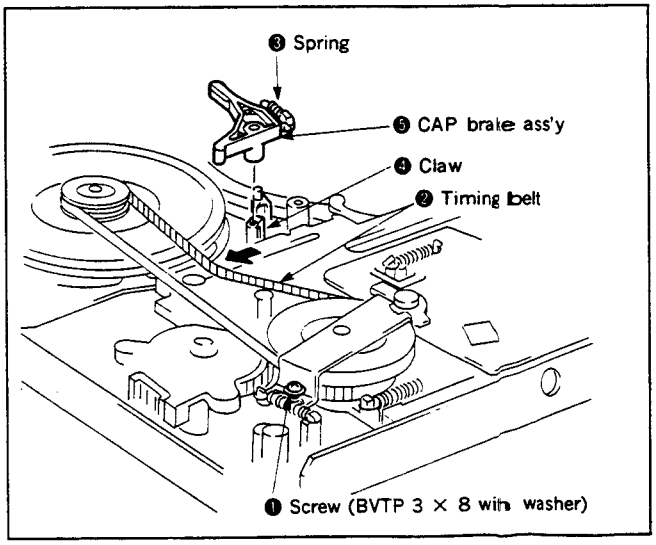


Fig. 3-28.

3-23. CAPSTAN MOTOR (Fig. 3-29)

1) Turn the ACE ass'y ❶ in the direction of arrow Ⓐ as shown in Fig. A below, then remove three screws ❷.
2) Remove screw ❸, then remove the rotor clamp ❹.
3) Turn the CAP brake ass'y ❺ in the direction of arrow Ⓑ, then pull out the capstan motor ❻.

[Precautions on remounting]

- Clean the section of the capstan motor ❻ where the tape is attached.
- Do not touch the brake shoe of the CAP brake ass'y ❺ directly with your fingers.
- Of the three screws ❷, first fasten screw A temporarily, then fasten screws B and C firmly, followed by screw A.
- The screw fastening torque must be within 3kg•cm ± 1kg•cm.

[Adjustments after mounting]

- Perform tape path adjustments as described in 4-1.

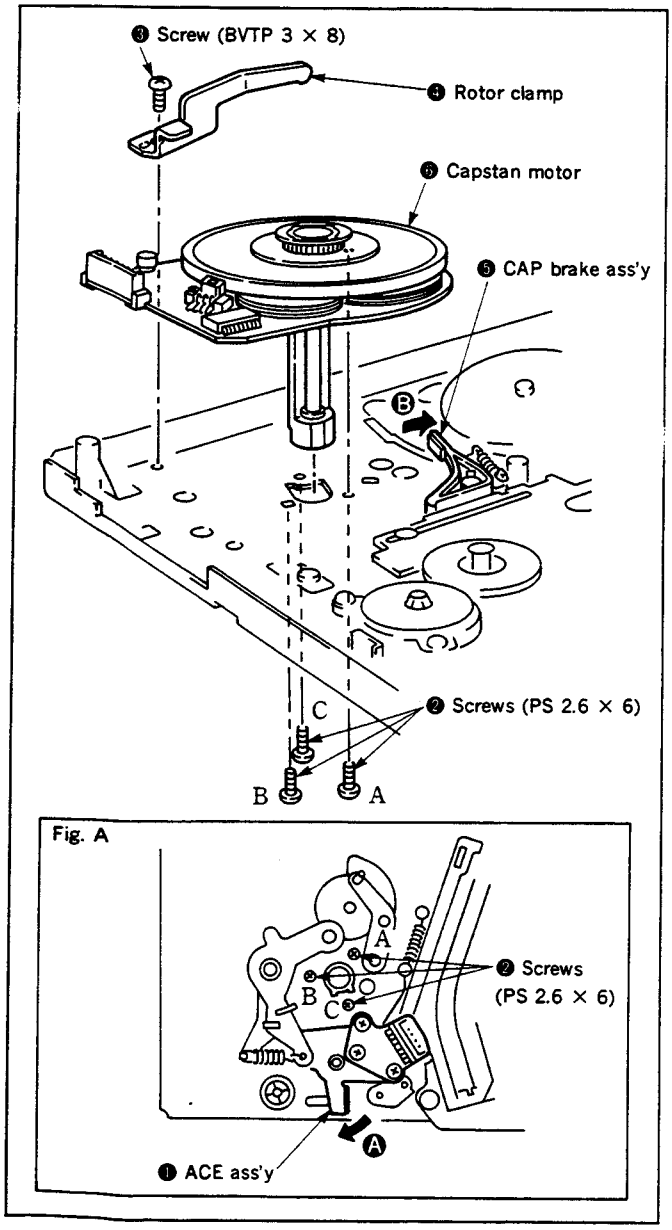


Fig. 3-29.

3-24. ROTARY SWITCH (Fig. 3-30)

1) Remove the adjuster arm ass'y. (Refer to 3-21.)
2) Remove the screws ❶ and ❷, then pull out the rotary switch ❸.

[Precautions on remounting]

- Match up the ● mark on the rotary switch ❸ with the ▲ mark on the RKB cam gear ❹ as shown in Fig. A.
- Match up holes ❻ on the pendulum arm ❺ and the chassis.

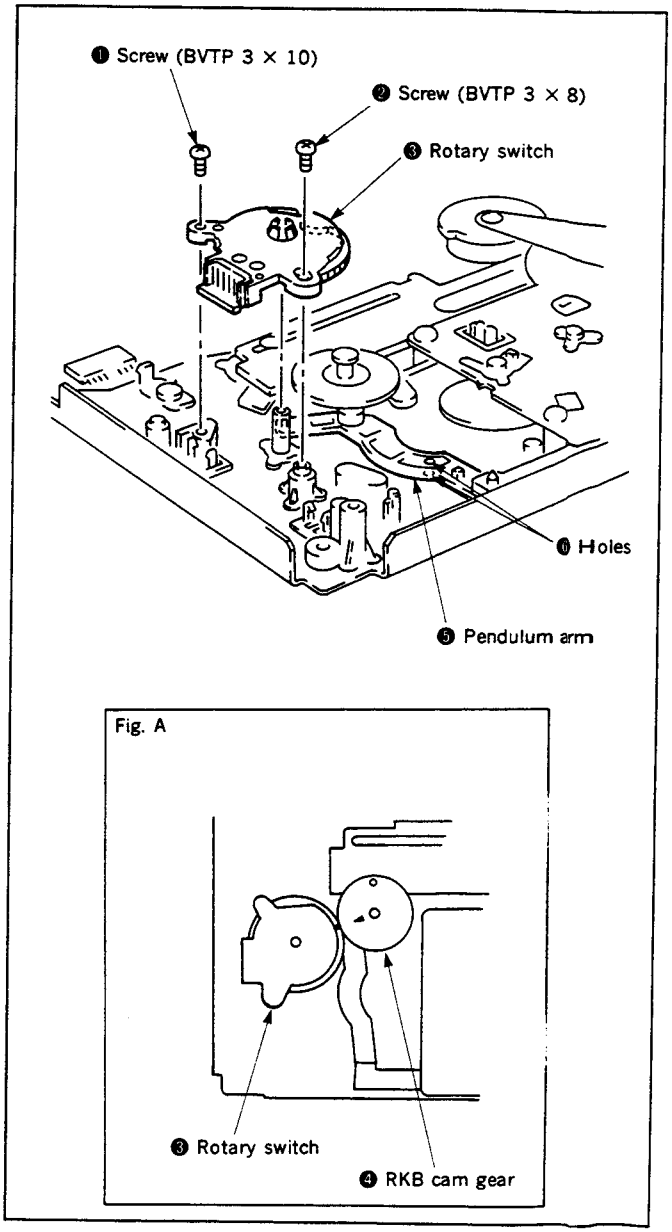


Fig. 3-30.

3-25. RKB CAM GEAR (Fig. 3-31)

1) Remove the adjuster arm ass'y. (Refer to 3-22.)
2) Remove washer 2 ❶, then pull out the RKB cam gear ❷.

[Precautions on remounting]

- When the limiter arm ❸ is pushed in the direction of the arrow, the pin must fit into the notch on the RKB cam gear ❷.
- The ■ mark on rotary switch ❺ must match up with the ◀ mark on the RKB cam gear ❷ as shown in Fig. A.
- Apply 1/2 drop of lubricant to shaft ❻.
- Match up the holes ❹ on the RKB cam gear ❷ and the mode slide plate.

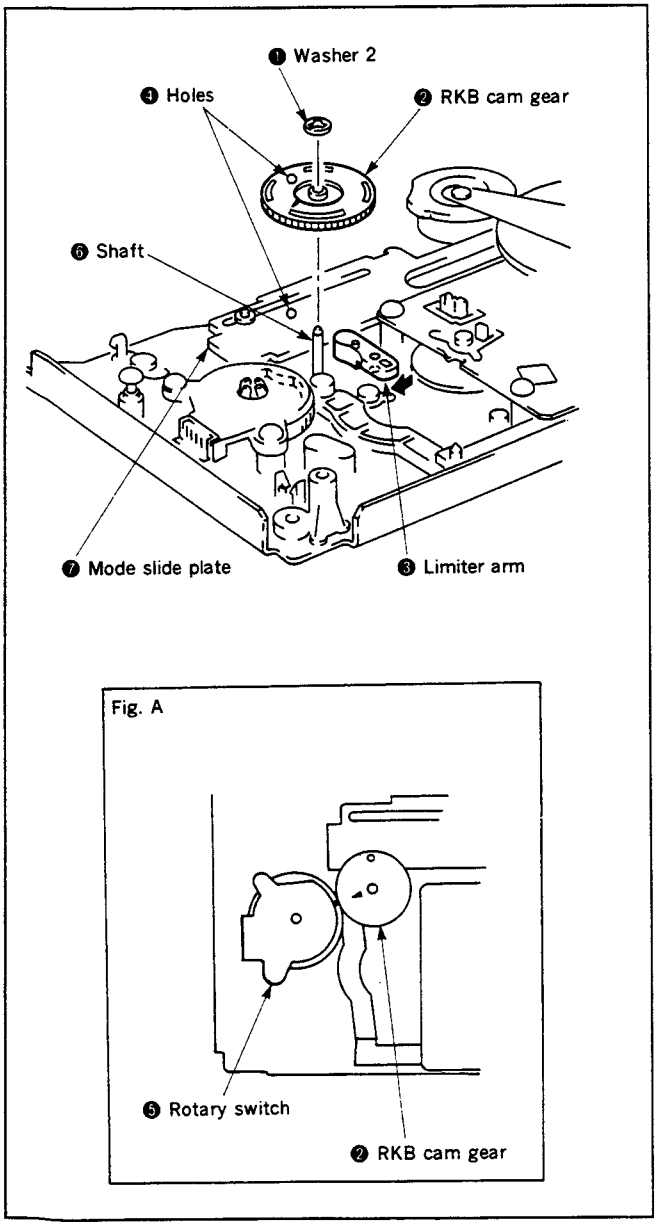


Fig. 3-31.

3-26. SUB-CHASSIS ASS'Y (Fig. 3-32)

1) Remove the reel lock release arm and REW gear. (Refer to 3-15.)
2) Remove the pendulum arm ass'y. (Refer to 3-19.)
3) Remove the adjuster arm ass'y. (Refer to 3-22.)
4) Remove the three screws ❶, then remove sub-chassis ass'y ❷.

[Precautions on remounting]

- The switching arm ❸ must be switched in the direction of the arrow.
- The screws must be fastened in order of a, b and c.
- Mount the sub-chassis carefully so as not to damage the gear.
- The corner edge of the lug terminal ❹ must fit into the gap between the chassis ass'y ❷ and mechanism chassis.

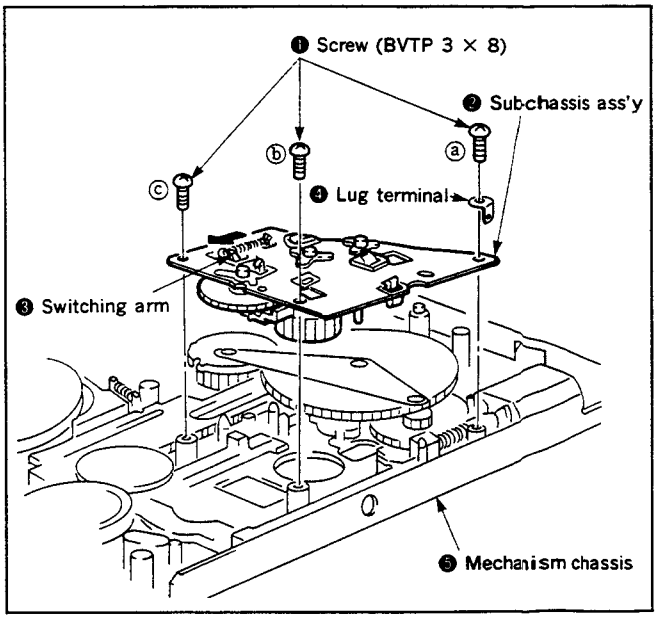


Fig. 3-32.

3-27. PENDULUM SLIDE PLATE, PENDULUM ARM (Fig. 3-33)

1) Remove the rotary switch. (Refer to 3-24.)
2) Remove the RKB cam gear. (Refer to 3-25.)
3) Remove the sub-chassis ass'y. (Refer to 3-26.)
4) Disengage the two claws ❶, then pull out the pendulum slide plate ❷.
5) Unhook the spring ❸.
6) Disengage the claw ❹, then pull out pendulum arm ❺.

[Precautions on remounting]

○ The shaft ❻ must fit into hole ❼.

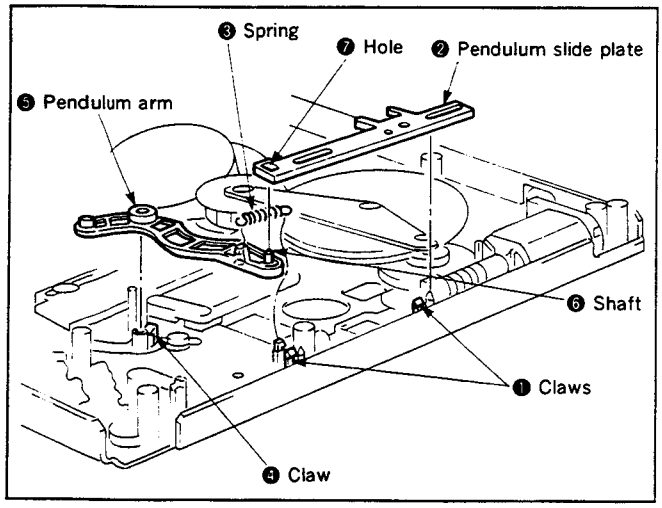


Fig. 3-33.

3-28. THE LIMITER ARM AND LIMITER SLIDE PLATE (Fig, 3-24)

1) Remove the RKB cam gear. (Refer to 3-25.)
2) Remove the sub-chassis. (Refer to Fig. 3-26.)
3) Disengage the claw ❶, then pull out the limiter arm ❷.
4) Disengage the two claws ❸, then pull out the limiter slide plate ❹.

[Precautions on remounting]

○ The shaft ❺ must fit into the hole ❻.

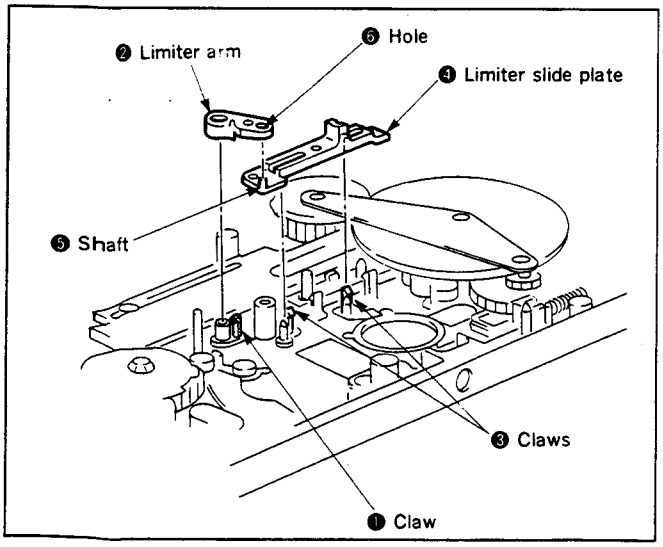


Fig. 3-34.

3-29. CAM MOTOR (Fig. 3-35)

1) Remove the sub- chassis ass'y. (Refer to 3-26.)
2) Disengage the six claws ❶, then remove the cam motor ❷ and worm gear ❸.

[Precautions on remounting]

○ Check the meshing of cam motor ❷ and worm gear ❸.

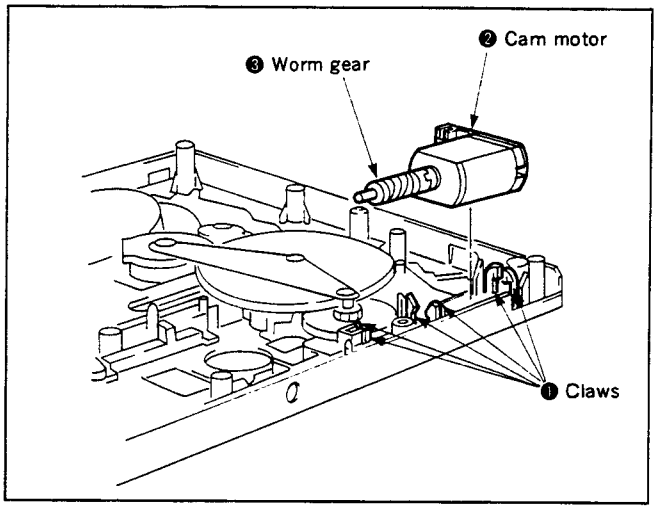


Fig. 3-35.

3-30. CAM GEAR (Fig. 3-36)

1) Remove the three washers 2 ❶, then pull out the cam gear holder ❷.
2) Pull out the cam gear ❸.

[Precautions on remounting]

○ Match up the right loading gear ass'y, the tension regulator arm, the S take-up arm, the work wheel, the brake arm and the mode slide plate with respective holes ❹ to ❾ on the chassis in that order.
○ Match up the hole ❿ on the mode slide plate with the hole ❿ in cam gear ❸.
○ Apply 1/2 drop of lubricant to the shaft ⓫.

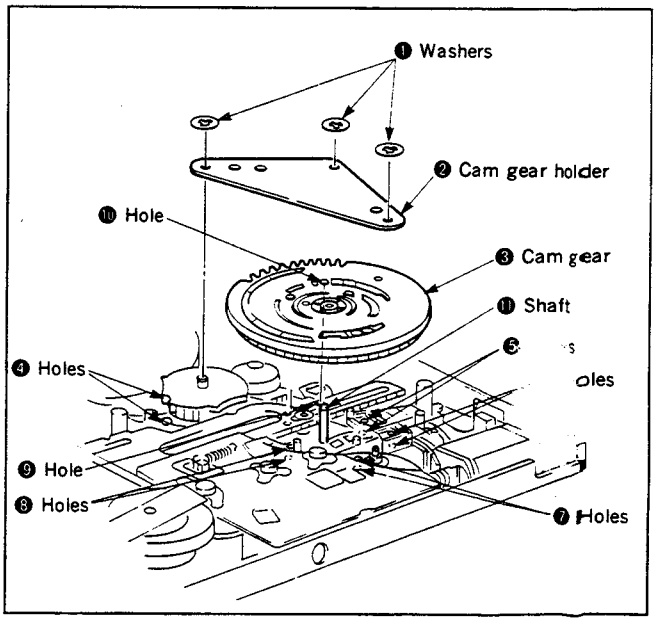


Fig. 3-36.

3-31. TENSION REGULATOR ARM, S TAKE-UP ARM (Fig. 3-37)

1) Remove the cam gear. (Refer to 3-30)
2) Disengage the claw ❶, then remove the tension regulator arm ❷.
3) Remove the end of the spring ❸ from the S take-up arm ❹.
4) Disengage the claw ❺, then pull out S take-up arm ❹.

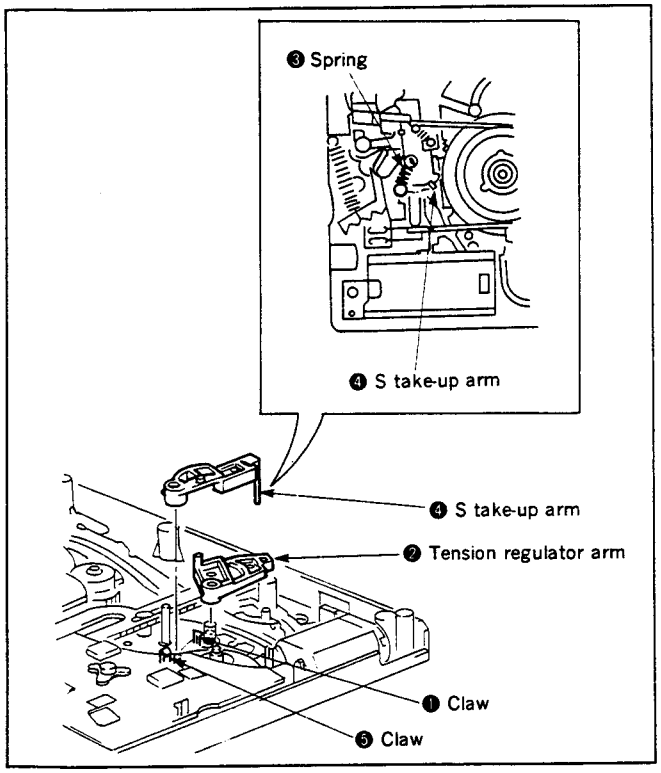


Fig. 3-37.

3-32. MODE SLIDE PLATE, RVS RELAY GEAR (Fig. 3-38)

1) Remove the RKB cam gear. (Refer to 3-25.)
2) Remove the cam gear. (Refer to 3-30.)
3) Remove the two washers 2 ❶.
4) Turn the CAP brake ❷ in the direction of the arrow, then pull out mode slide plate ❸.
5) Pull out the RVS relay gear ❹.

[Precautions on remounting]

- Match up the hole ❺ on the RVS relay gear ❹ with hole ❺ in the chassis.
- Match up the holes ❻ on the mode slide plate ❸ with holes ❻ in the chassis.
- Apply 1/2 drop of lubricant to the shaft ❼.

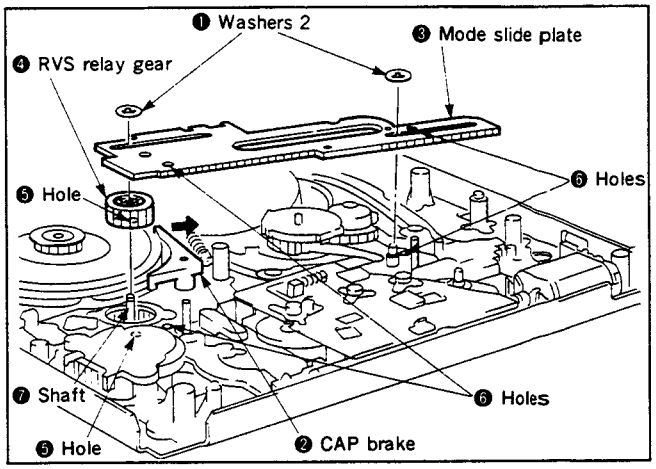


Fig. 3-38.

3-33. BRAKE ARM, BRAKE SLIDE PLATE (Fig. 3-39)

1) Remove the sub-chassis. (Refer to 3-26.)
2) Remove the cam gear. (Refer to 3-30.)
3) Disengage the claw ❶, then pull out the brake arm ❷.
4) Disengage the two claws ❸, then pull out the brake slide plate ❹.

[Precautions on remounting]

- Insert the shaft ❺ into hole ❻.

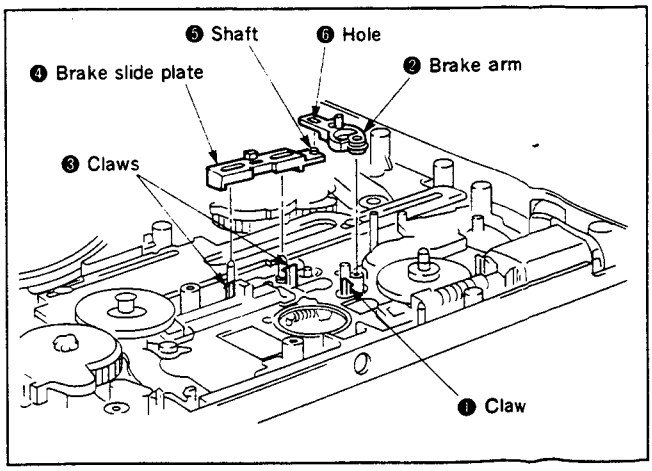


Fig. 3-39.

3-34. RIGHT SHUTTLE, RIGHT LOADING GEAR ASSY'S (Fig. 3-40)

1) Remove the mode slide plate. (Refer to 3-32.)
2) Remove the plastic slider ❶, then pull out the right shuttle ass'y ❷.
3) Pull out the right loading gear ass'y ❸.

[Precautions on remounting]

- ○ Match up the ▲ mark on the right loading gear ass'y ❸ with the ▲ mark on the left loading gear ass'y ❹ as shown in Fig. A below.
- ○ Apply 1/2 drop of lubricant to the shaft ❺.
- ○ Do not hold on to the arm when pressing on the right loading gear ❸.
- ○ Clean the section of the right shuttle ass'y ❷ where the tape is attached.

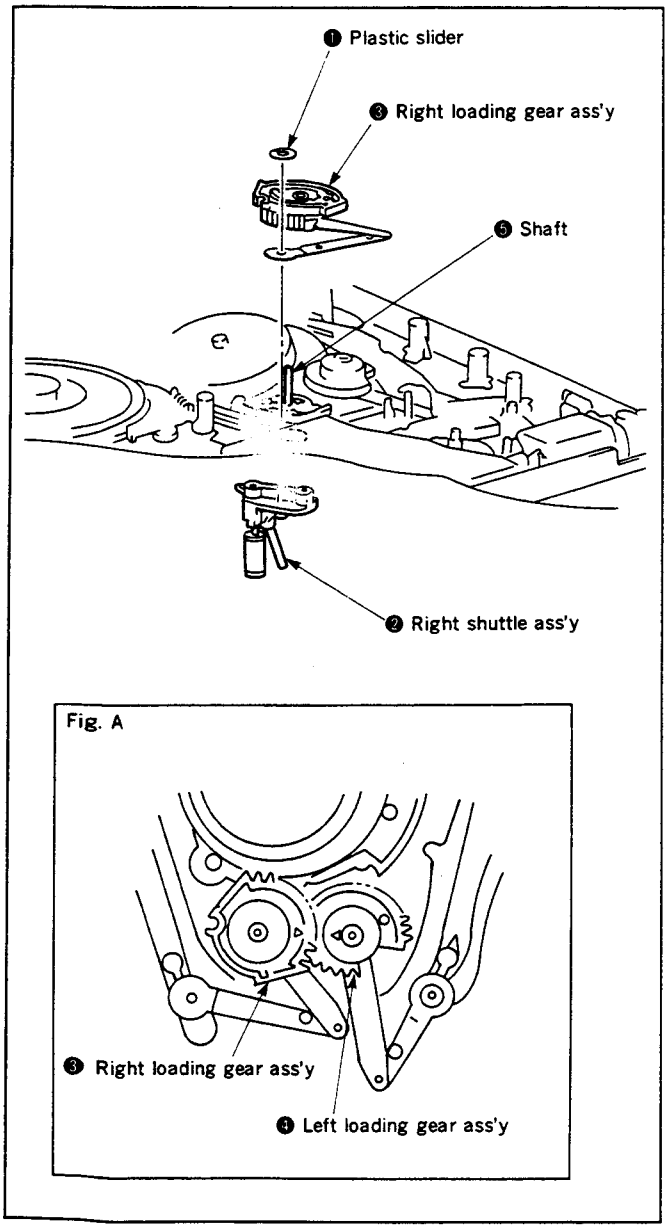


Fig. 3-40.

3-35. LEFT SHUTTLE ASS'Y, LEFT LOADING GEAR ASS'Y (Fig. 3-41)

1) Remove the right shuttle ass'y and right loading gear ass'y. (Refer to 3-34.)
2) Remove the plastic slider ❶, then pull out the left shuttle ass'y ❷.
3) Remove washer 2 ❸, then pull out the left loading gear ass'y ❹.

[Precautions on remounting]

- ○ Apply 1/2 drop of lubricant to shaft ❺.
- ○ The tension regulator arm ass'y ❻ and left shuttle ass'y ❷ must be positioned as shown in Fig. A below.
- ○ Do not hold on to the arm of the left loading gear ass'y ❹ when the left loading gear ass'y ❹ is pressed.
- ○ Clean the section of the felt shuttle ass'y ❷ where the tape is attached.

[Adjustments after replacement]

- ○ Perform tape path adjustments as described in 4-1.

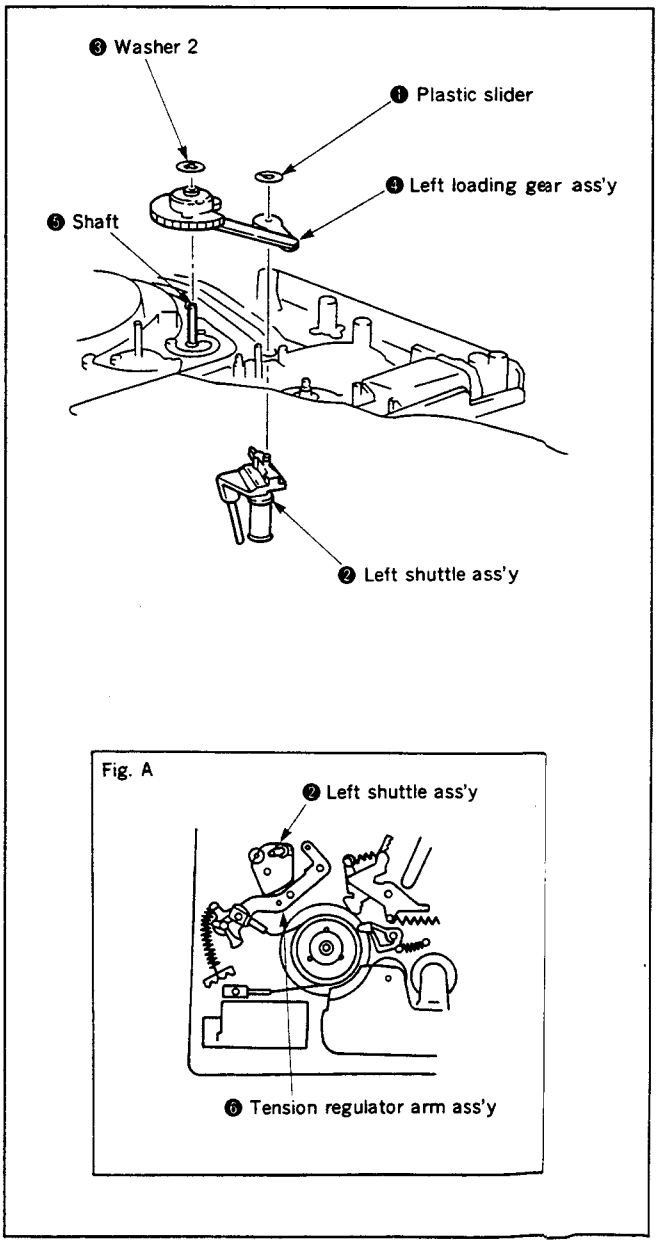


Fig. 3-41.

3-36. C-ROLLER ARM ASS'Y, C-ROLLER RELEASE LEVER (Fig. 3-42)

1) Disengage the claw ❶, then pull out the C-roller arm ass'y ❷.
2) Unhook the end of the spring ❸ from the chassis.
3) Disengage the two claws ❹, then pull out the C-roller release lever ❺.

[Precautions on remounting]

○ Mount C-roller arm ass'y ❷ so that the hole ❻ on the C-roller arm ass'y ❷ fits into the boss ❼ on the C-roller release lever ❺.

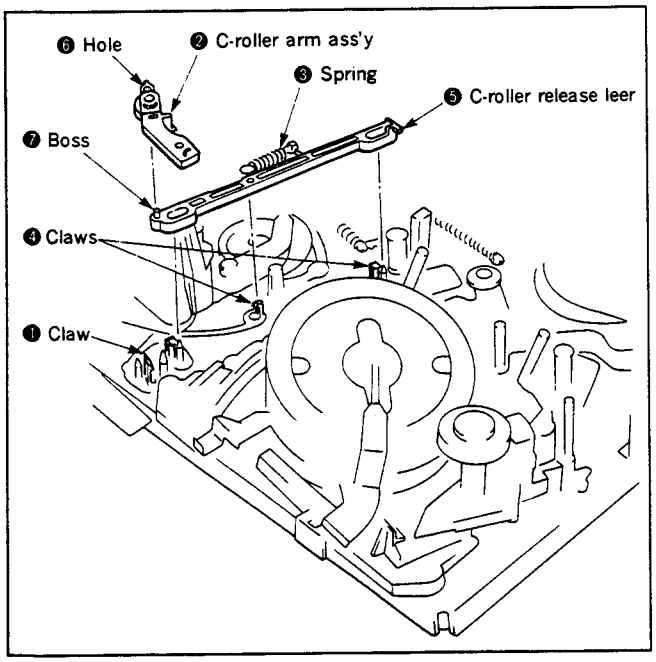


Fig. 3-42.

4. ADJUSTMENT

4-1. TAPE PATH ADJUSTMENT

The "Tape path" refers to the route of the tape from the supply reel disk to the take-up reel disc via the video heads. Each component part of the tape transport system, particularly the surface of parts which make direct contact with the tape must always be kept clean, free of dust, oil, scratches and so forth.

The tape path system is factory preadjusted. when parts of the tape transport system are replaced, be sure to make the required adjustments as precisely as possible in order to ensure stable tape transport.

4-1-1. Tension regulator position/tension adjustment (Fig. 4-1.)

Purpose: Stabilizes contact of the video head and the tape to maintain the tension of the tape so that it feeds at a constant level.

- **Position adjustment**

Mode	Threading is completed without a cassette loaded. (Refer to section 1-2.)
Adjustment locations	Tension band holder

[Adjustment method]

1) Allow the unit to go through the threading procedure without a cassette loaded.
2) Set the VTR unit to playback, then turn the tension band adjuster lever so that the gap between guide No. 0 and tension arm is within 4.5±0.4mm. *(Set the unit to playback without a cassette loaded.)
3) After adjustment, go through the loading procedure once more without a cassette loaded, then check the position of the tension arm.

- **Tension adjustment**

Mode	Playback
Measuring instrument/tool	Torque cassette
Adjustment locations	Position for hooking the tension spring
Specification	28 to 34 g•cm

[Adjustment method]

1) Playback the torque cassette.
2) Check that the center value deviation reading on the torque cassette meets with the standards.
3) When the reading is higher than the standards : Move the spring toward direction Ⓐ.
   When the reading is less than the standards: Move the spring toward direction Ⓑ.

Note: Move the spring to the tension spring hook position and recheck the tension arm position. If the arm position is misaligned, adjust the position and tension of the tension arm.

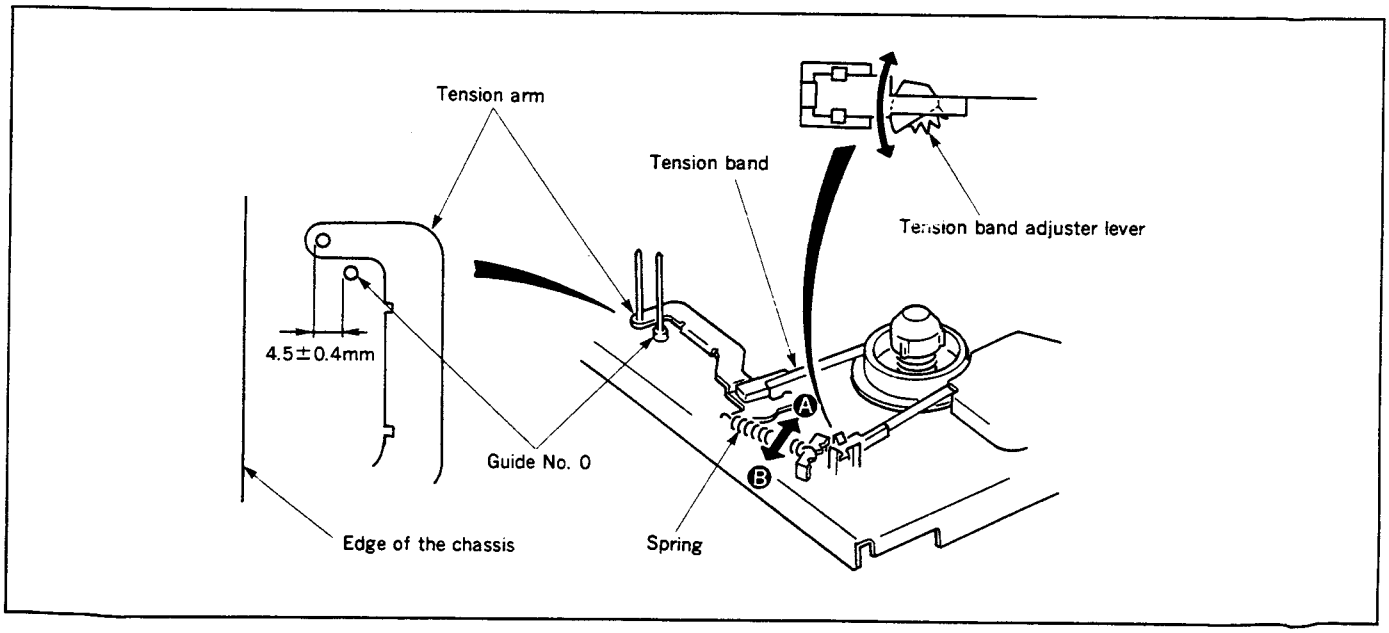


Fig. 4-1.

4-1-2. Height adjustment of the guide roller No. 2 (Fig. 4-2)

Mode	Playback
Tool	Blank tape
Adjustment locations	Guide roller height adjuster screw

[Adjustment method]

1) Load a new tape in the unit, then play it back.
2) Make sure that the lower flange of guide roller No. 2 does not curl up.
3) When the tape curls up: Turn the guide roller adjuster screw clockwise.
   When the tape does not fit into the lower flange: Turn the guide roller adjuster screw counter-clockwise.
4) After the above check, separate the tension arm from the tape, then re-attach it slowly. At this time, check if the tape curls up at the lower flange of the guide roller No. 2 and if the curl disappears within 2 seconds.
5) If curl does not disappear in two seconds: Turn the adjuster screw clockwise.
   If the tape does not curl up: Turn the adjuster screw counter-clockwise.

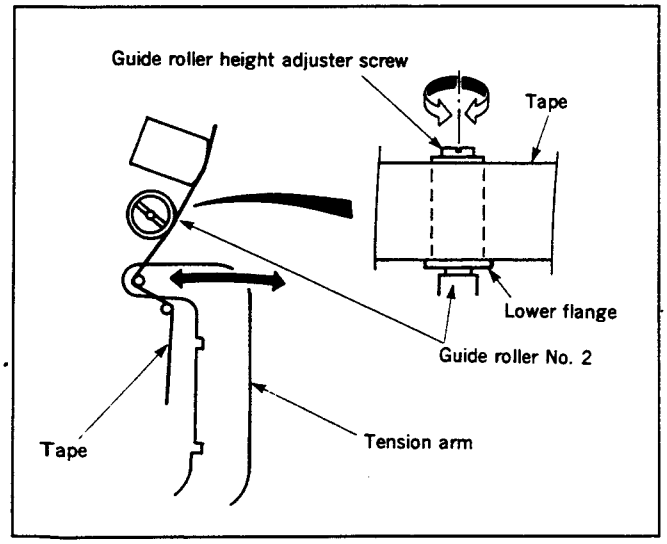


Fig. 4-2.

4-1-3. Height adjustment of guide roller No. 7 and the RVS arm (Fig. 4-3.)

Mode	Playback
Tool	Blank tape
Adjustment locations	Height adjuster nut

[Adjustment method]

1) Load the tape into the VTR and play it back, then adjust the height of the guide roller No. 7 so that the tape runs along the lower flange of guide roller No. 7.
2) If the guide roller is too low: Turn the height adjuster nut counter-clockwise.
   If the guide roller is too high: Turn the height adjuster nut clockwise.
3) Run the tape in REV, then adjust the height of the RVS arm so that the tape runs along guide roller No. 7.
4) If the tape gets caught in the upper flange of guide roller No. 7: Turn the RVS arm height adjuster nut clockwise.
5) If the tape catches on the lower flange of guide roller No. 7 : Turn the RVS arm height adjuster nut counter-clockwise.

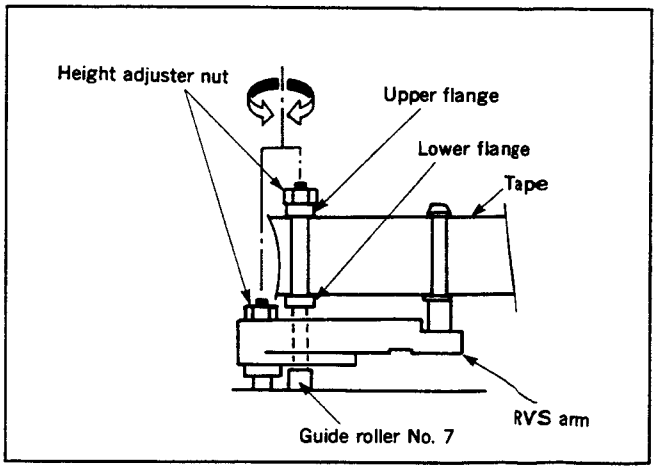


Fig. 4-3.

4-1-4. Height adjustment of guide rollers No. 3 and No. 6 (Fig. 4-4)

Mode	Playback
Signal	Hi-Fi alignment tape (Hi-Fi 400Hz)
Measuring instrument	Oscilloscope
Measuring point	CH-1 : Connector PB RF pin for RF PC board check. CH-2 : Connector RF SW P pin for RF PC board check.
Adjustment locations	Guide roller height adjuster screw.

[Adjustment method]

1) Tracking (playback) : Turn off the auto tracking, then press the tracking buttons ▽ and △ simultaneously to set the tracking at the center position.
   (If adjustment is made after the drum is replaced, the tracking must be set at the max. Rf output position.)
2) Height adjuster screw: Even out the RF output waveforms.
3) Press the tracking buttons (playback), ▽ and △ alternately.
4) Check that RF output drops the same amount at the front and rear edges.

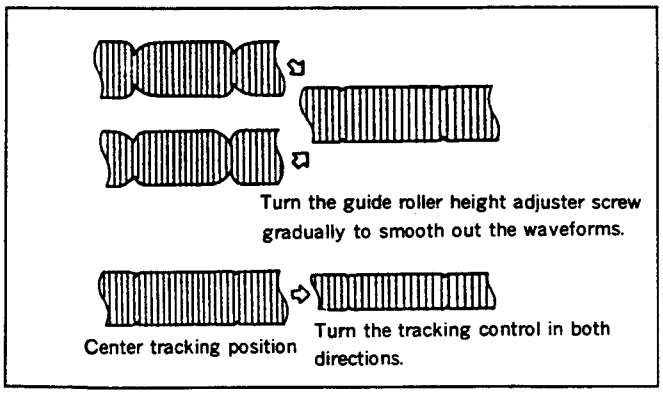


Fig. 4-4.

4-1-5. ACE head ass'y adjustment (rough adjustment) (Figs. 4-5 and 4-6)

Purpose : Allows the tape to make even contact with the head for recording and playback of the specified track.

Mode	Playback
Tool	Blank tape
Adjustment locations	Height adjuster nut, tilt adjuster screw

[Adjustment method]

1) Mount the ACE head ass'y. At this time, adjust the height so that the height of guide flange No. 7 matches the level of the lower edge of the control head.
2) Remove the adjustment tool and load a new tape, then set the unit for playback.
3) Check that the tape does not curl or raise up noticeably near the ACE head.
4) If the yape curls up or rarises noticeably, readjust the tilt adjuster screw, the azimuth adjuster screw and the height adjuster nut.
   (The height of the ACE head should be adjusted so that the lower edge of the tape is approx. 0.1 to 0.15mm from the control head.)
5) Perform precision adjustment.

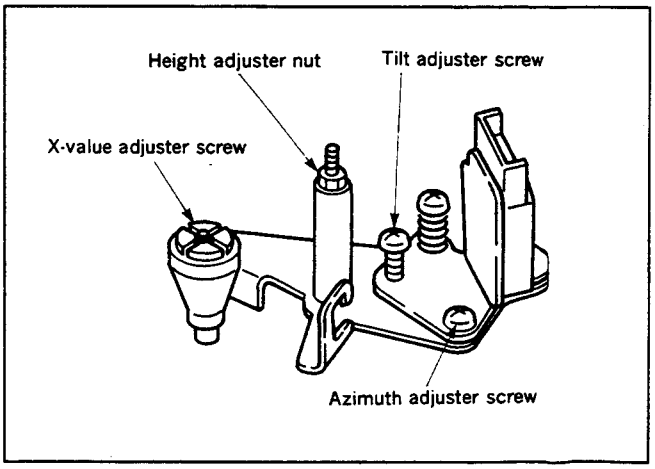


Fig. 4-5.

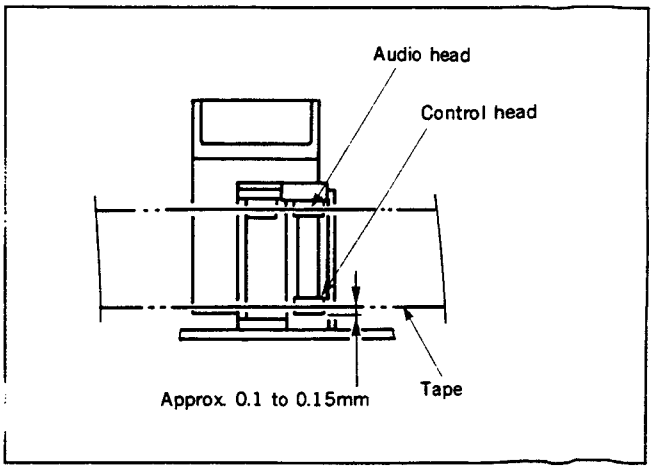


Fig. 4-6.

4-1-6. ACE head assembly adjustment (precision adjustment)

Mode	Playback
Signal	Alignment tape (JVC-MH-1 1KHz)
Measuring instrument	Oscilloscope
Measuring point	Audio output terminal
Adjustment locations	Azimuth adjuster screw Height adjuster nut Tilt adjuster screw

[Adjustment method]

1) Adjust the tilt adjuster screw in the FWD or REV mode so that the lower flange of guide No. 7 does not curl up or raise.
2) Alternately adjust the azimuth adjuster screw, the height adjuster nut, and the tilt adjuster screw to maintain even audio output at maximum with minimum deviation.

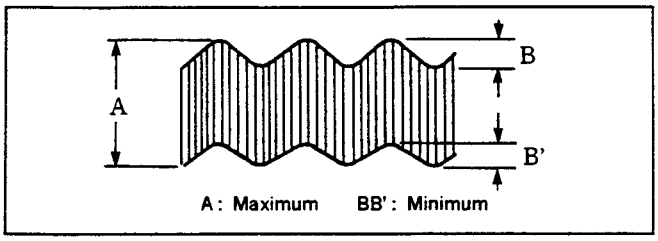


Fig. 4-7.

4-1-7. X-value adjustment

Purpose : To obtain compatibility with other VTR.

Precaution : Be sure to perform the preset tracking adjustment before perform this adjustment. (Refer to the Service Guide.)
Turn off the auto tracking and set the VTR for manual tracking mode.

Mode	Playbadk
Signal	Hi-Fi alignment tape (Hi-Fi 400Hz), alignment tape (JVC-MH-1)
Measuring instrument	Oscilloscope
Measuring point	CH-1 : Connector PB RF pin for RF PC board check. CH-2 : Connector RF SW P pin for RF PC board check. (Check with the CHA head)
Adjustment locations	X-value adjuster screw

[Adjustment method]

- **Adjustment by Hi-Fi alignment tape**
  When the tracking is set at the center position (by pressing the ▽ and △ keys simultaneously), adjust the RF output to maximum.

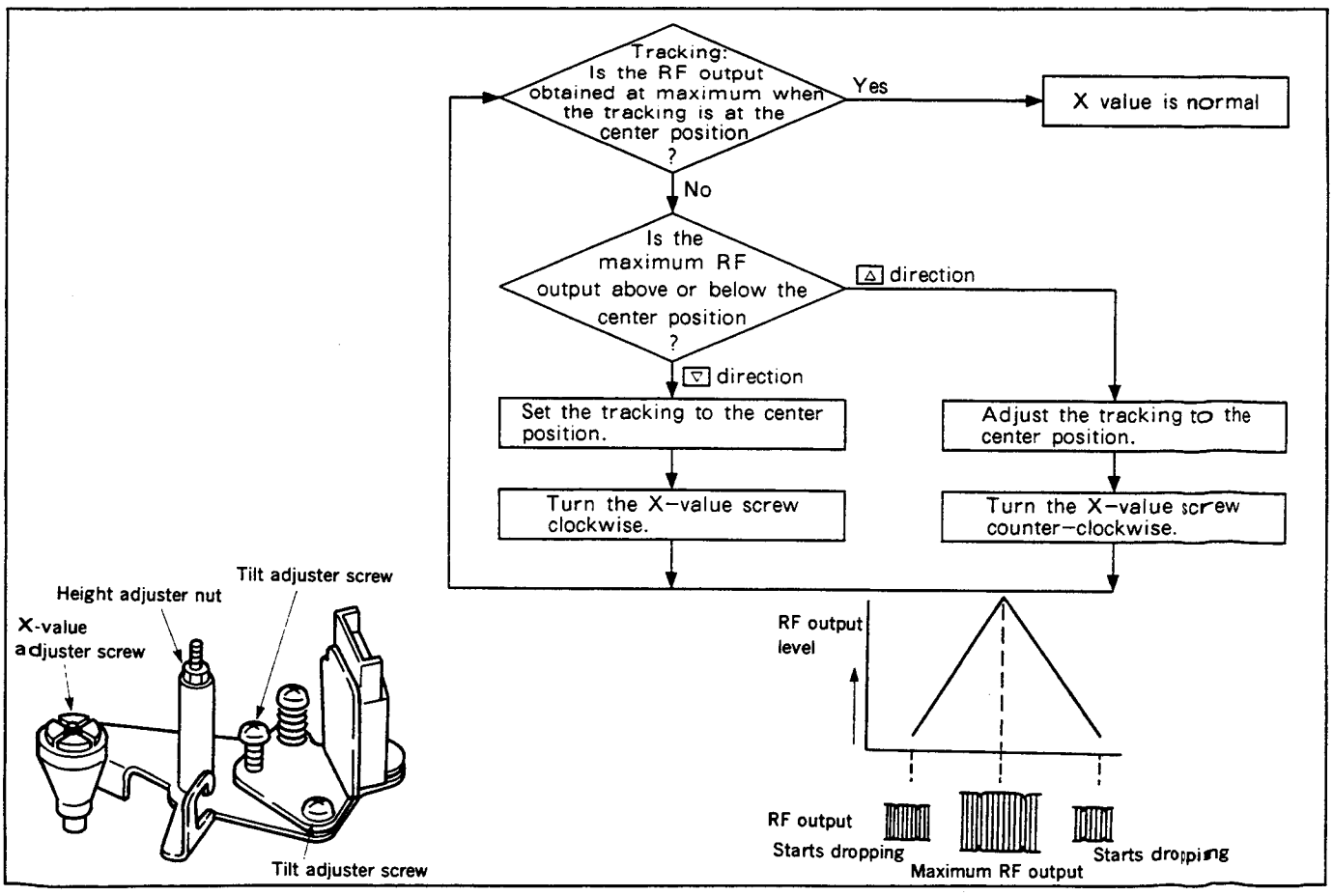


Fig. 4-8.

- **Adjustment by Alignment tape (JVC-MH-1)**
  Adjust the X-value adjuster screw so that maximum RF output is obtained and also that the RF output drops to the same position on pressing the respective ▽ and △ buttons while the tracking is set at the center position.

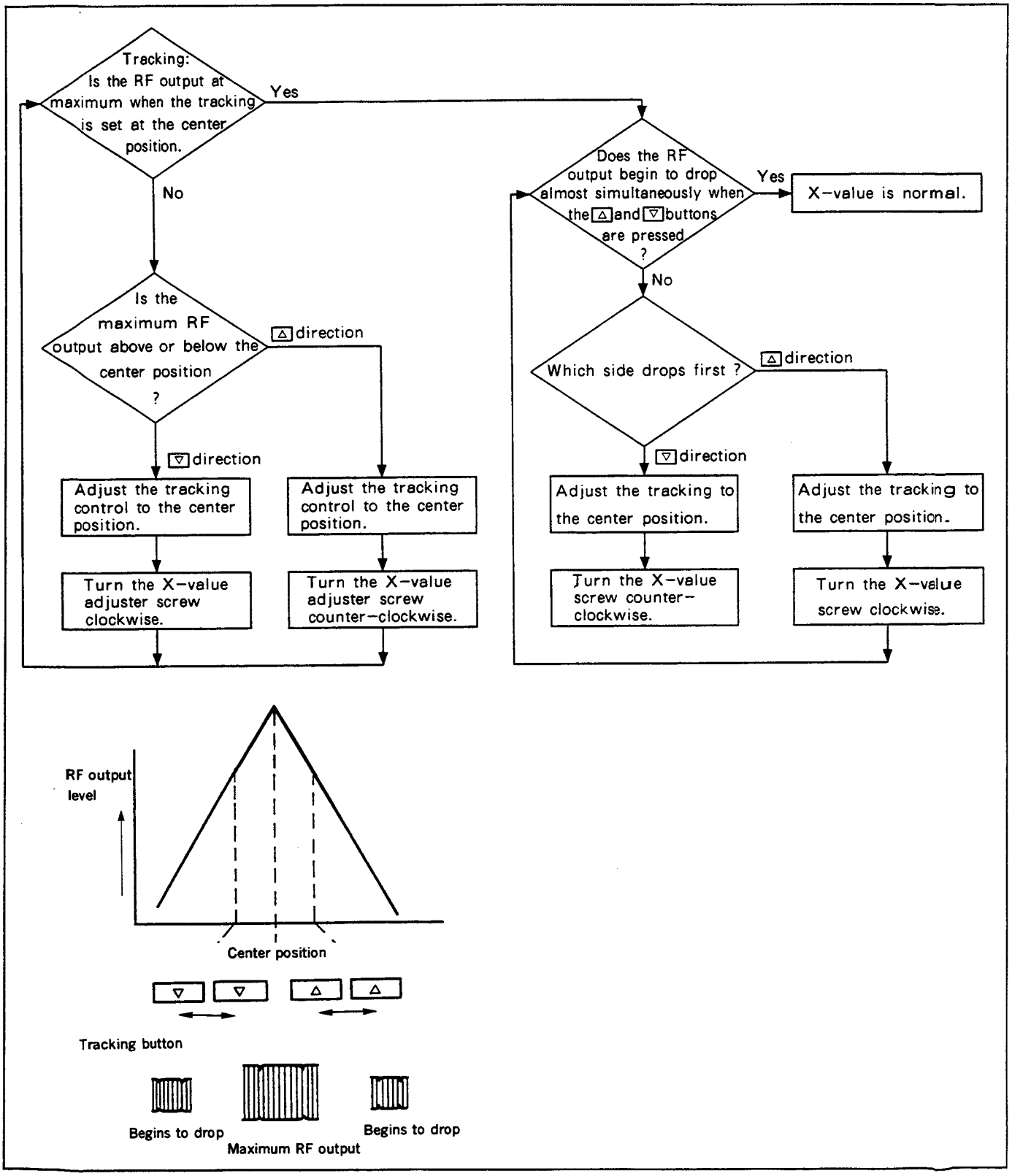


Fig. 4-9.

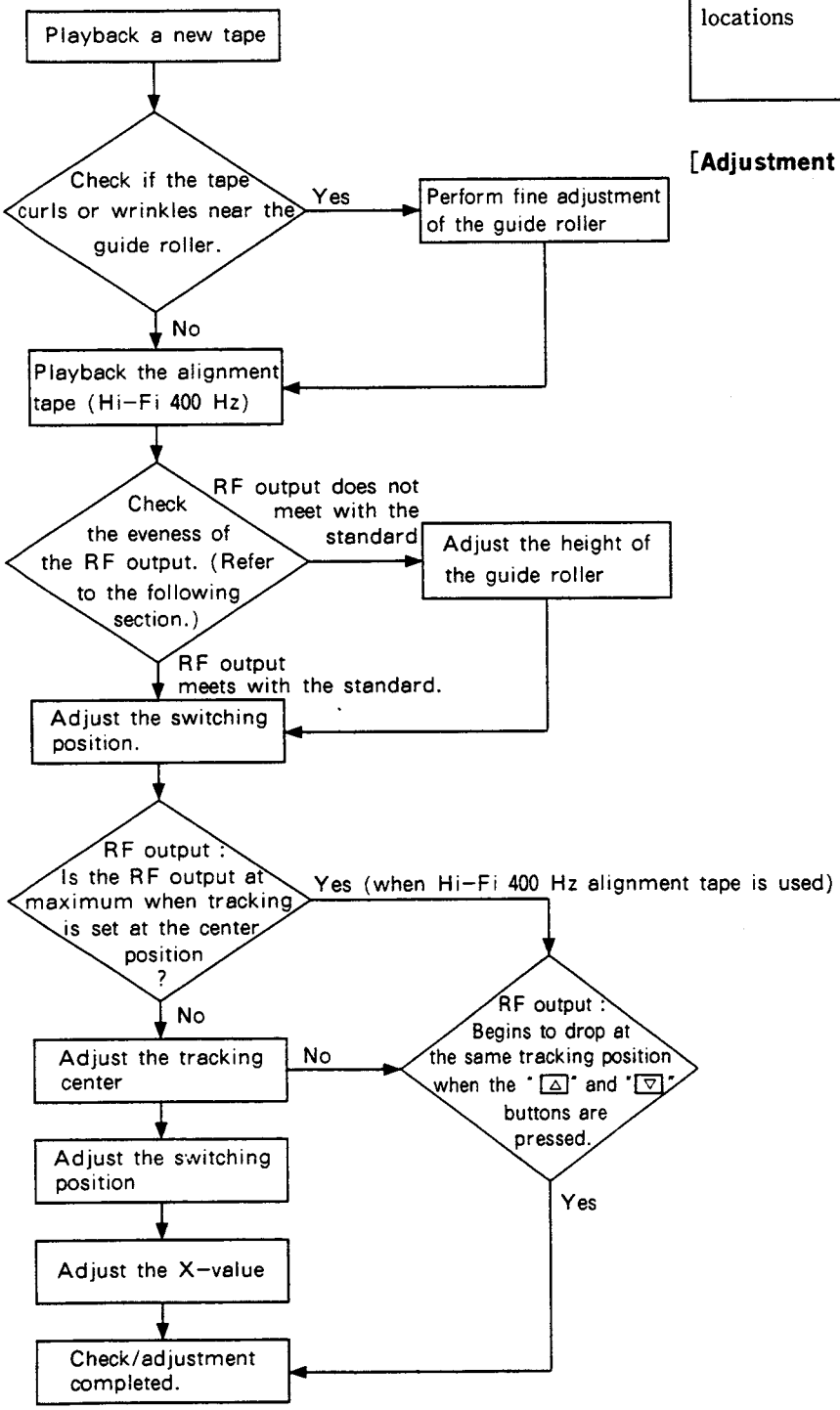
4-1-8. Adjustments after replacing the drum (video head)

Purpose : Co-relative height, X-value and other factors of the drum will deviate from those of the guide roller. If the drum is replaced properly, these deviations are extremely small.

Precaution : Turn off the auto tracking and set the manual tracking mode.

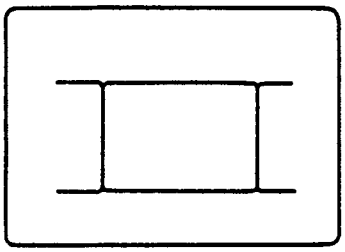
Mode	Playback
Signal	Alignment tape (JVC-MH-1), blank tape
Measuring instrument	Oscilloscope
Measuring point	CH-1 : Connector PB RF pin for RF PC board check. CH-2 : Connector RF SW P pin for RF PC board check.
Adjustment locations	Guide roller (refer to 4-1-5.) Switching position, Tracking preset, SP delay mono-multi, X-value (refer to 4-1-8) } (Refer to the Service Guide)

[Adjustment method]

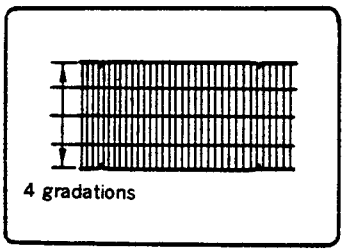


[Checking the eveness and fluctuation of the RF output]

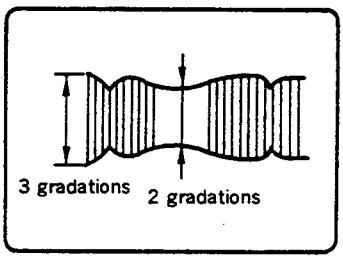
1) Set the RF output to the maximum level using the tracking buttons.



2) Perform fine adjustment of the voltage level range of the oscilloscope, then adjust the RF output deviation to within 4 gradations.



3) Press the tracking buttons and adjust the maximum amplitude of the RF output to within 3 gradations.
4) At this time, check if the minimum amplitude is more than 2 gradations.



5) Check that the RF output fluctuation between minimum and maximum levels is within 13%.

4-1-9. Checking the tension and torque

Purpose: To check that the tension, torque and compression force of the tape take-up section and mobile sections to ensure smooth tape run and achieve standard VTR performance.
If the tape transport is not smooth or problems occur in relation to the tape transport speed, perform the following check.

Mode	Each operation mode without loading a cassette tape. (Refer to section 1-3.)
Measuring instrument	Torque gauge, Torque gauge adapter

Item	VTR operation mode	Reel to be measured	Measurement value
Main brake torque	Stop	Supply and take-up reels	170g•cm or more
Review torque	Review	Supply reel	180±30g•cm (using the torque cassette)
Take-up torque	Playback	Take-up reel	80 to 140g•cm (using torque cassette)
Back tension torque	Rewind	Take-up reel	4 to 25 g•cm

[Check method]
Measure the torque using the torque gauge and torque gauge adaptor with the torque gauge fixed.

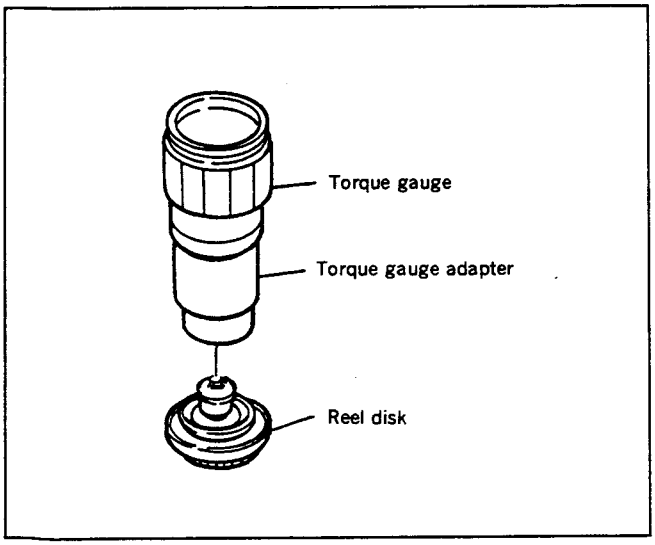


Fig. 4-13.